

ORDER NO. KMF0109511C3

Service Manual

Multi-Function Plain Paper Fax

KX-FM89BX / KX-FM89CX

(for Asia, Middle Near East and Africa)



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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.

1. INTRODUCTION

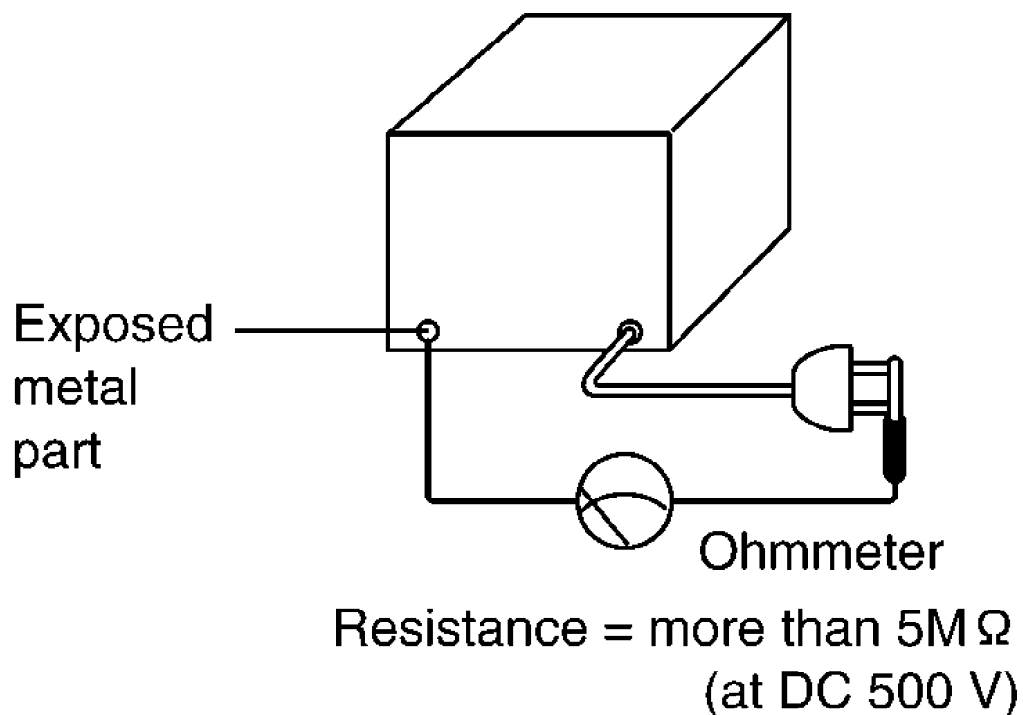
1.1. SAFETY PRECAUTIONS

- 1. Before servicing, unplug the AC power cord to prevent an electric shock.**
- 2. When replacing parts, use only the manufacturer's recommended components.**

3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.2. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).
Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.



1.3. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

- 1. Cover the plastic part's boxes with aluminum foil.**
- 2. Ground the soldering irons.**
- 3. Use a conductive mat on the worktable.**
- 4. Do not touch the IC or LSI pins with bare fingers.**

1.4. BATTERY CAUTION

CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution :

Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.

A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.

Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.

Recommend Type Number:

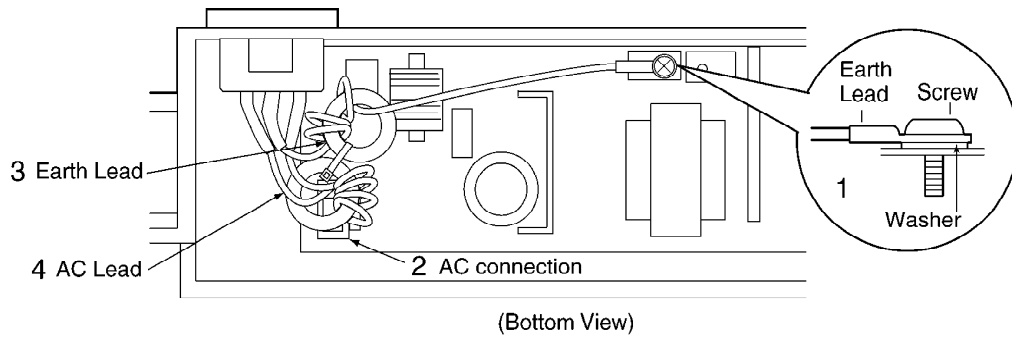
CR2032 (BAT501) Manufactured by MATSUSHITA

CR2032 (BAT501) Manufactured by SONY

1.5. AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

- 1. The earth lead is fixed with the screw.**
- 2. The AC connector is connected properly.**
- 3. Wrap the earth lead around the core 3 times.**
- 4. Wrap the AC lead around the core 2 times (for KX-FM89BX).
Wrap the AC lead around the core 3 times (for KX-FM89CX).**

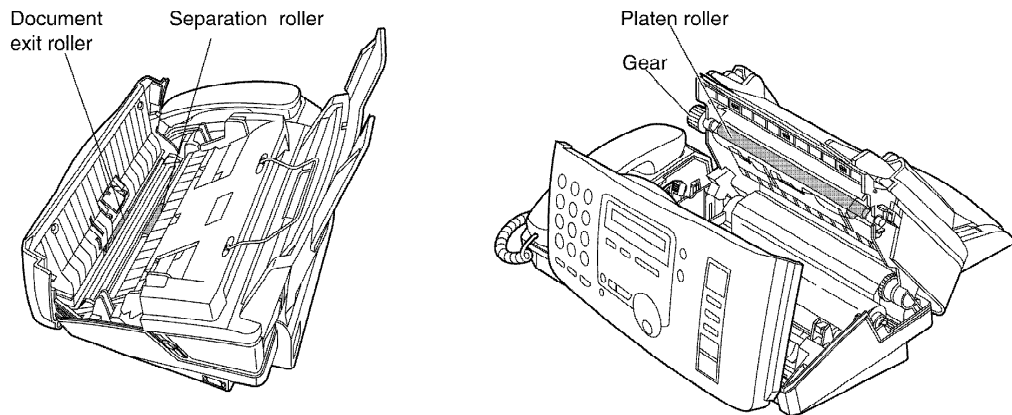


1.6. PERSONAL SAFETY PRECAUTIONS

1.6.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.

The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.

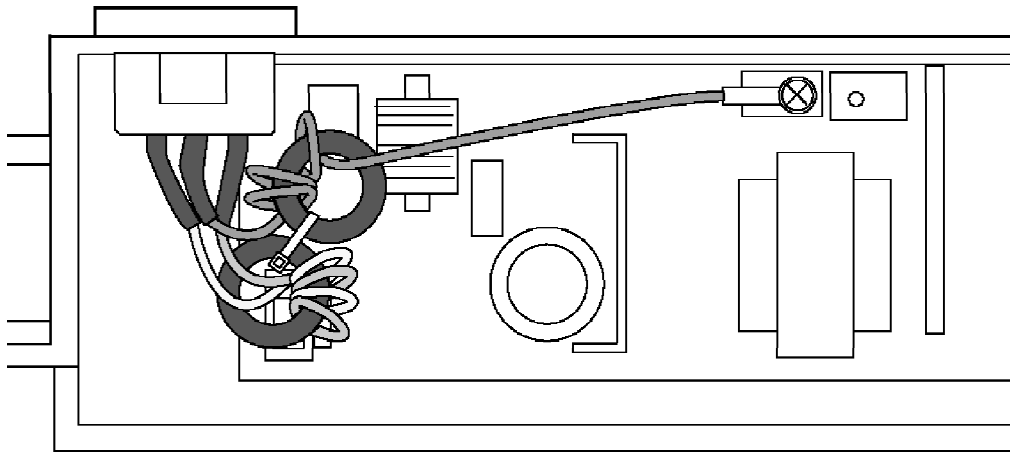


1.6.2. LIVE ELECTRICAL SECTIONS

All the electrical sections of the unit supplied with AC power by the AC power cord are live. Never disassemble the unit for service with the AC power supply plugged in.

CAUTION:

AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.



(Bottom View)

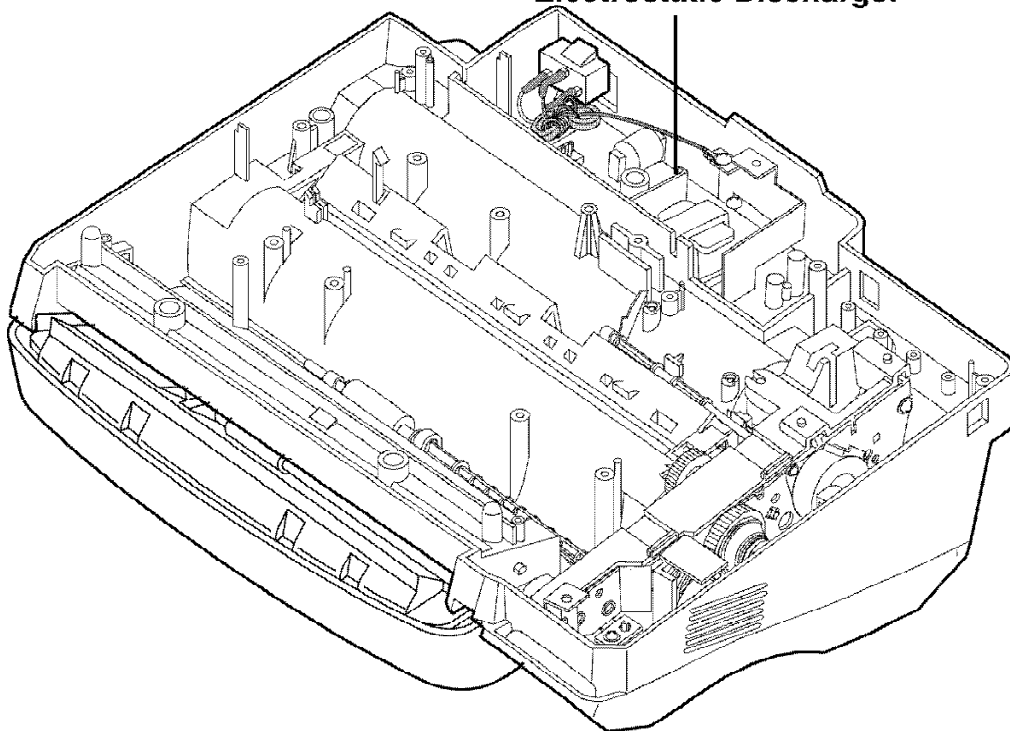
1.7. SERVICE PRECAUTIONS

1.7.1. PRECAUTIONS TO PREVENT DAMAGE FROM STATIC ELECTRICITY

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.



Electrostatic Discharge!



1.8. FEATURES

General

- Help function

Please refer to **WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION.**() to print below features.

Display:

1. SEND GUIDE
2. QUICK SET UP
3. FEATURE LIST
4. EASY DIAL
5. TAD OPERATION
6. FAX RECEIVING
7. COPIER
8. ERRORS
9. REPORTS

- LCD (Liquid Crystal Display) readout

Plain Paper Facsimile Machine

- 8 second transmission speed *
- A4/Letter, G3 compatible
- Automatic document feeder (10 sheets)
- Fax pager call
- Quick scan
- Resolution: Standard/Fine/Super fine/Half tone (64 level)
- Broad cast with Easy Dial
- 50-sheet paper capacity (20 lb.)
- Automatic fax/phone switching
- Distinctive ring detection **

* The 8 second speed is based upon the ITU-T No. 1 Test Chart on the condition that memory transmission is performed.

** Subscription to distinctive ring services is required.

Large Memory (28 pages)... Performed by DRAM

Approx. 28 pages of memory reception

Approx. 25 pages of memory transmission

Integrated Telephone System

- On-hook dialing
- Digital duplex speakerphone
- Voice muting

- Redialing function
- 100-Station telephone directory with Easy Dial

Enhanced Copier Function

- Multi-copy function (up to 50 copies)
- Enlargement and reduction
- Collate
- 64-Level halftone

Digital Answering System

- Voice Time/Day Stamp
- 18-Minutes recording time
- Voice and fax paper call

Printer function

- 200x400dpi printer capability
- Windows ® 95/98/ME-ready printer driver

PC fax

- Send and Receive Faxes from your PC.
- 500-name address book

Scanner

- 200x400dpi scanning capability
- Easy to use document viewer

Note:

Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

1.9. SPECIFICATIONS

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm (8 1/2") in width

Max. 600 mm (23 5/8") in length

Effective Scanning Width:

208 mm (8 3/16")

Recording Paper Size:

Letter: 216×279 mm (8 1/2"×11")

A4: 210×297 mm (8 1/4"×11 11/16")

[Refer to [INSTALLING THE RECORDING PAPER](#) ()]

Effective Printing Width:

208 mm (8 3/16")

Transmission Time*:

Approx. 8 s/page (Original mode)**

Scanning Density:

Horizontal:

8 pels/mm (203 pels/inch)

Vertical:

3.85 lines/mm (98 lines/inch)—STANDARD mode

7.7 lines/mm (196 lines/inch)—FINE/HALF TONE mode

15.4 lines/mm (392 lines/inch)—SUPER FINE Mode

Halftone Level:

64-level

Scanner Type:

Contact Image Sensor (CIS)

Printer Type:

Thermal Transfer on Plain Paper

Data Compression System:

Modified Huffman (MH), Modified READ (MR), Modified Modified READ (MMR)

Modem Speed:

14,400/12,000/9,600/7,200/4,800/2,400 bps; Automatic Fallback

Operating Environment:

5—35°C (41—95°F), 20—80 % RH (Relative Humidity)

Dimensions (H×W×D):

185×345×276 mm (7 9/32"×13 19/32"×10 7/8")

Mass (Weight):

Approx. 3.2 kg (8.5 lb.)

Power Consumption:

Standby: Approx. 4 W (for KX-FM89BX) / 4.5W (for KX-FM89CX)

Transmission: Approx. 15 W

Reception: Approx. 40 W (When receiving a 20% black document)

Copy: Approx. 40 W (When copying a 20% black document)

Maximum: Approx. 125 W (When copying a 100% black document)

Power Supply:

220-240 V AC, 50/60 Hz

Memory Capacity:

Voice memory**:**

Approx. 18 minutes of recording time including greeting messages

Fax memory:

Approx. 28 pages memory reception

Approx. 25 pages memory transmission

(Based on ITU-T No. 1 Test Chart in standard resolution.)

* Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the other party's machine.

** The 8 second speed is based upon the ITU-T No. 1 Test Chart and original mode. (Refer to "1.11. ITU-T No. 1 Test Chart".) If the capability of the other party's machine is inferior to your unit, the transmission time may be longer.

*** Recording time may be reduced by the calling party's background noise.

Note:

- Any details given in these instructions are subject to change without notice.
- The pictures and illustrations in these instructions may vary slightly from the actual product.

Design and specifications are subject to change without notice.

1.10. OPTIONAL ACCESSORIES

- For best results, use genuine Panasonic replacement film Model No. KX-FA53A or KX-FA55A.

Model No.	Description	Specifications
KX-FA53A	Replacement Film	1 roll-216 mm x 50 m (8 1/2"x164')
KX-FA55A	Replacement Film	2 rolls-216 mm x 50 m (8 1/2"x164')

Note:

The ink film is not reusable. Do not rewind and use the ink film again.

1.11. TEST CHART

1.11.1. ITU-T No.1 TEST CHART



THE SLEREXE COMPANY LIMITED

SAPORS LANE - BOOLE - DORSET - BH 25 8 ER

TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC

18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

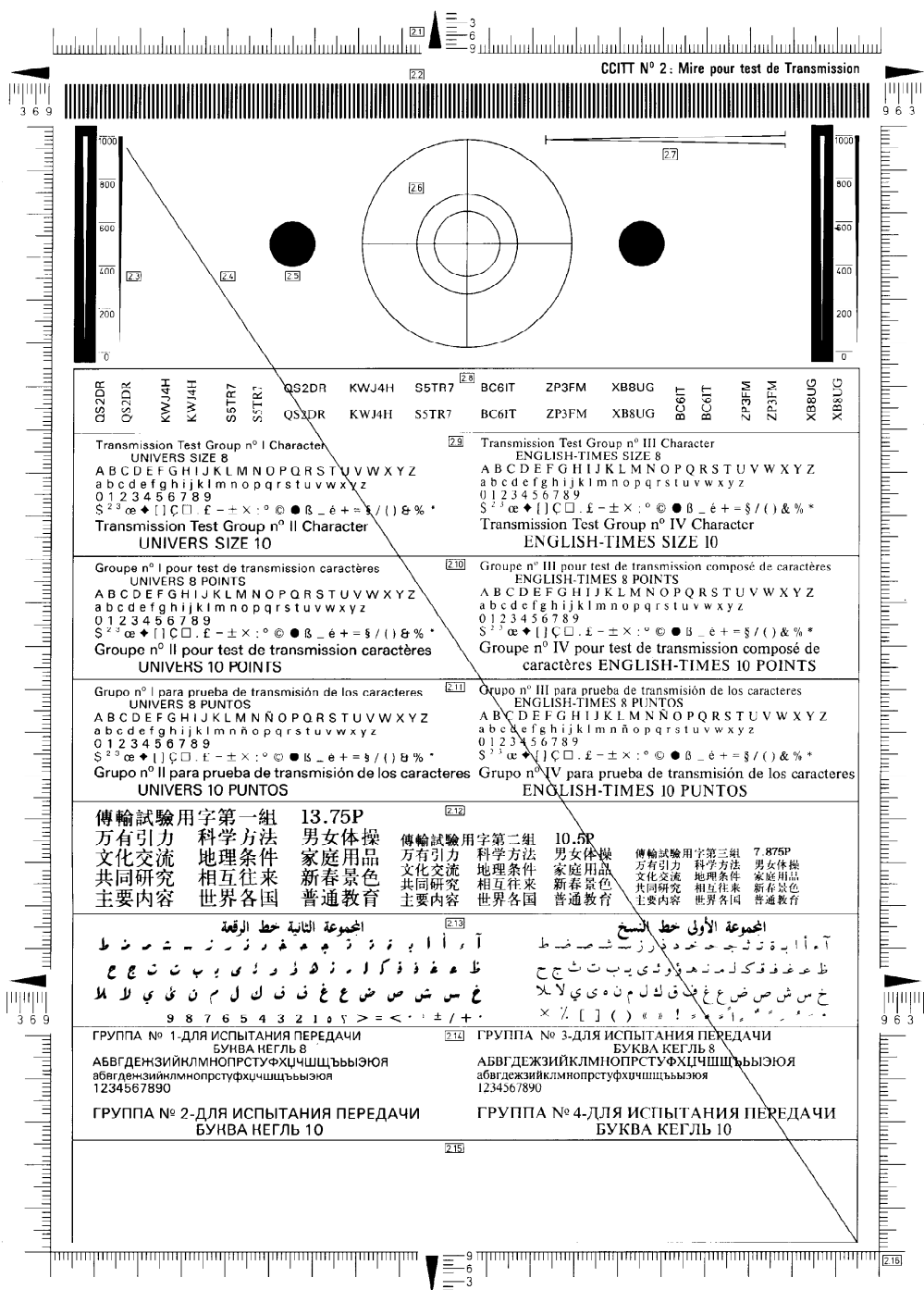
Probably you have uses for this facility in your organisation.

Yours sincerely,

P.J. CROSS
Group Leader - Facsimile Research

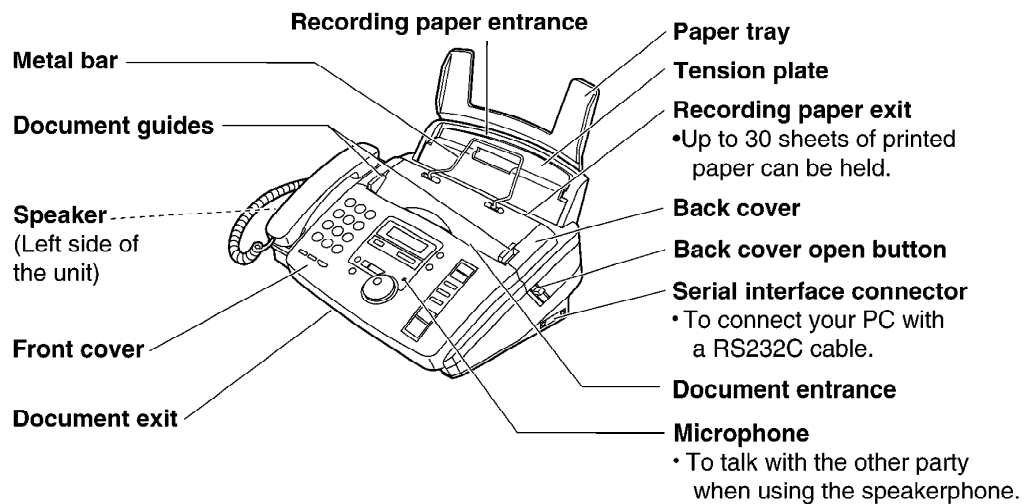
Registered in England: No. 2038
Registered Office: 60 Vicars Lane, Ilford, Essex.

1.11.2. ITU-T No.2 TEST CHART



1.12. LOCATION OF CONTROLS

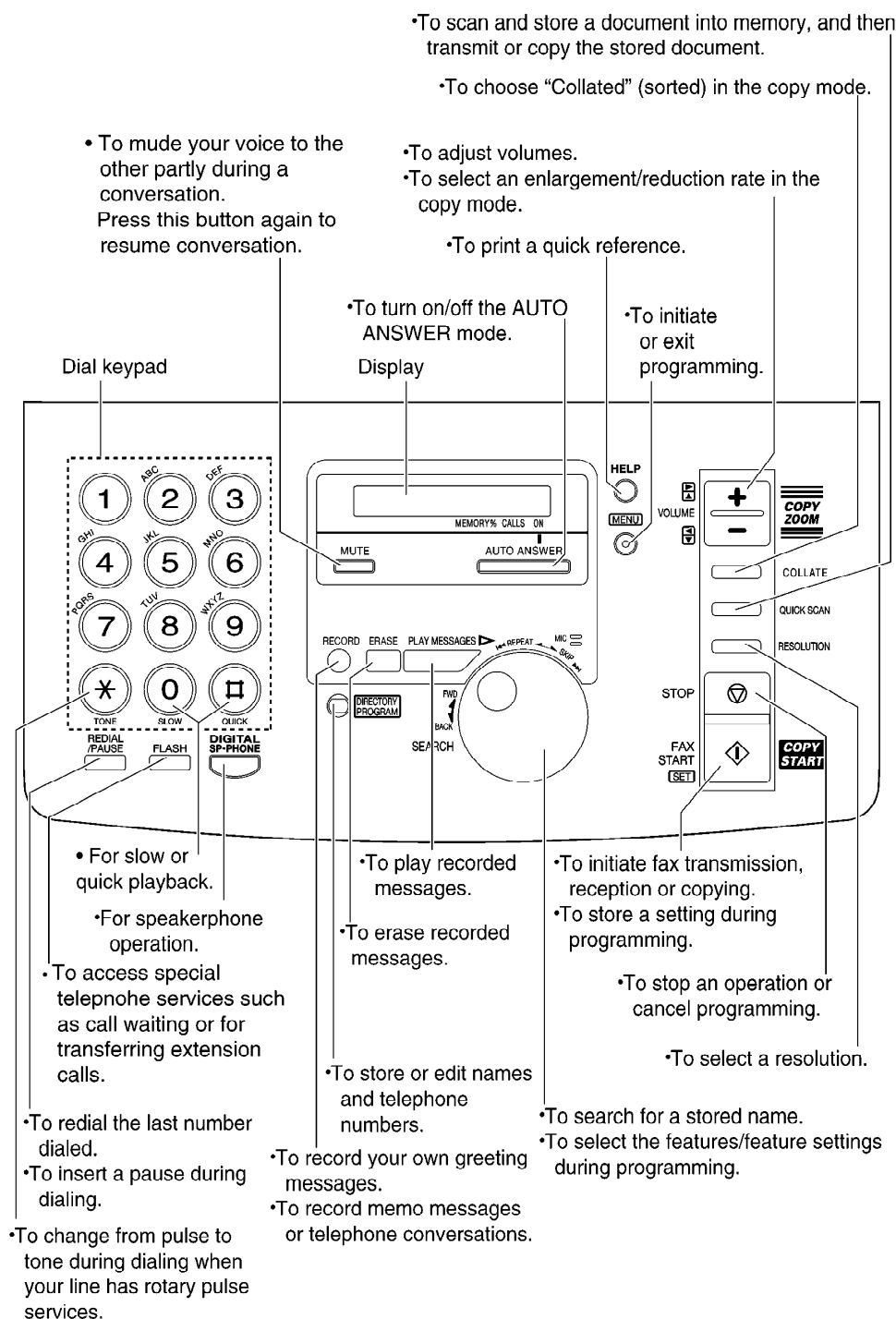
1.12.1. OVERVIEW



Note:

- The document will be ejected from the front of the unit. Install the unit on a desk or floor with a smooth surface and do not place anything in front of the unit.

1.12.2. CONTROL PANEL

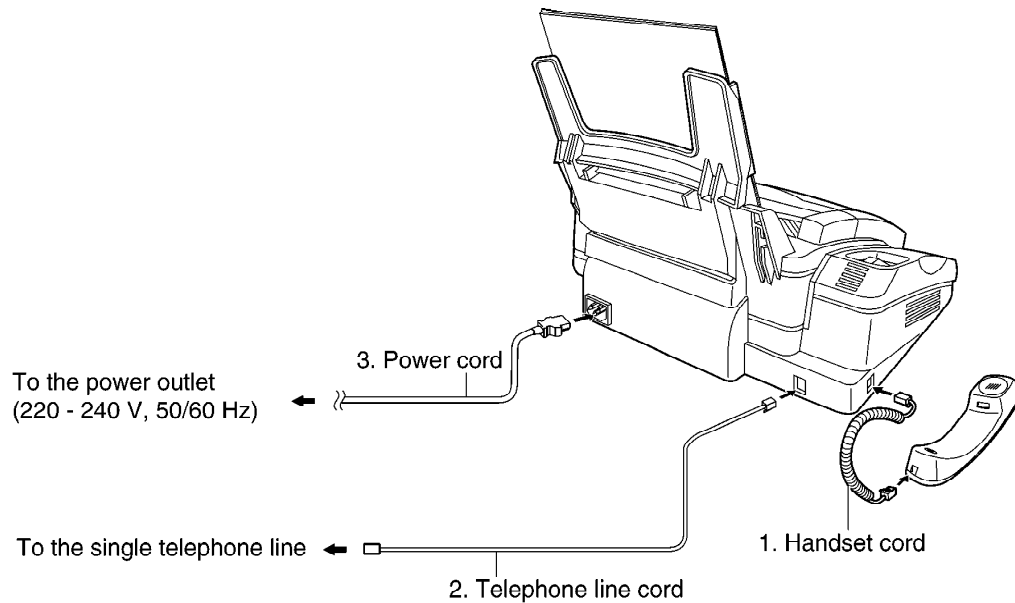


1.13. CONNECTIONS

1.13.1. CONNECT CORDS

- (1) Connect the handset cord.
- (2) Connect the telephone line cord.
- (3) Connect the power cord.

- When the power is turned on for the first time, the unit will print some basic information.



Note:

- When you operate this product, the power outlet should be near the product and easily accessible.

To use the fax machine with a computer on the same line

- We recommend you use separate wall jacks for the fax machine and the computer.
- Set the fax machine to TEL mode.
- The device which has the shortest ring setting will answer the call first.
- If the computer provides a port for telephone line, connect the fax machine to this port on the computer.

1.13.2. CONNECT TO A COMPUTER

Refer to **PANA LINK** ().

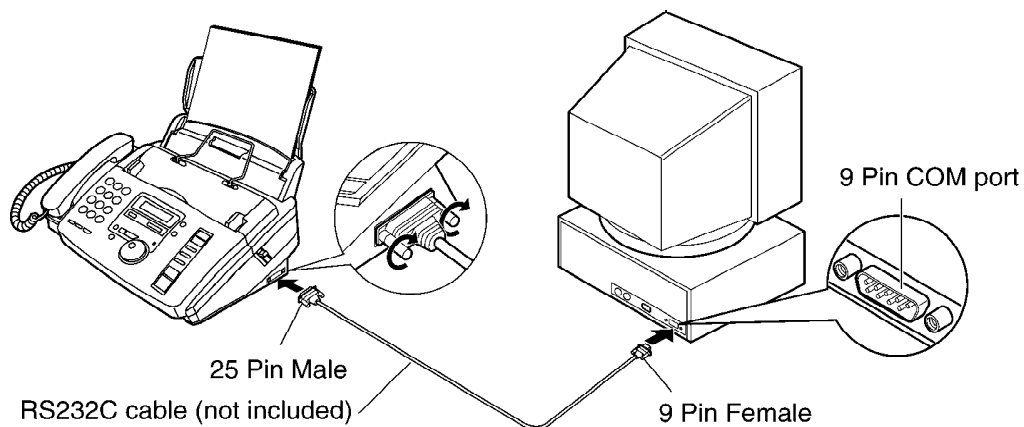
Panasonic PANA LINK software enables your fax machine to carry out the following functions:

- Sending fax documents created on your PC
- Receiving faxes on your PC
- Storing fax and phone unmbers into the directory
- Using the fax machine as a printer and a scanner

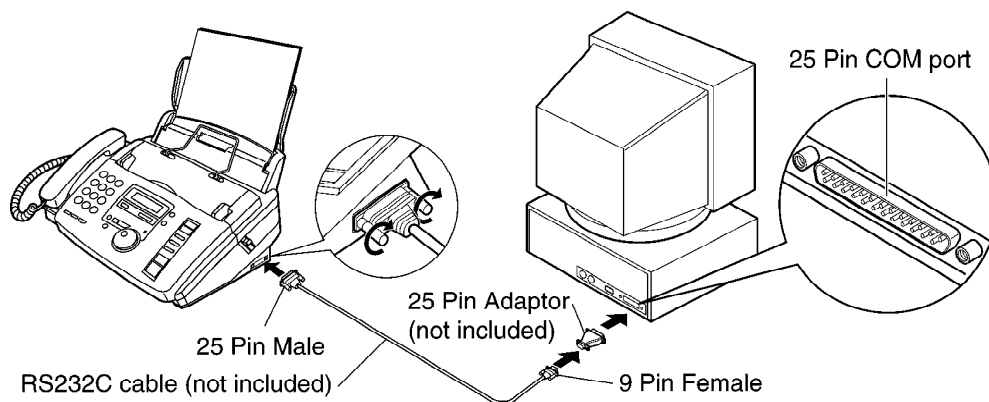
To run PANA LINK software, you need the following:

Compatible OS:	Microsoft ® Windows ® 95 / 98 / Me	
CPU:	Windows 95 / 98:	An IBM compatible personal computer with a 486 or high processor (Pentium ® is recommended.)
	Windows Me:	Pentium 150MHz or higher processor
Memory minimum:	Windows 95 / 98:	16 MB (32 MB or more is recommended.)
	Windows Me:	32 MB (64 MB or more is recommended.)
Hard disk:	More than 40 MB available space	
Other:	RS232C Serial Port and CD-ROM drive	

1.13.2.1. IF YOUR PC HAS A 9 PIN COM PORT:



1.13.2.2. IF YOUR PC HAS A 25 PIN COM PORT:



Note:

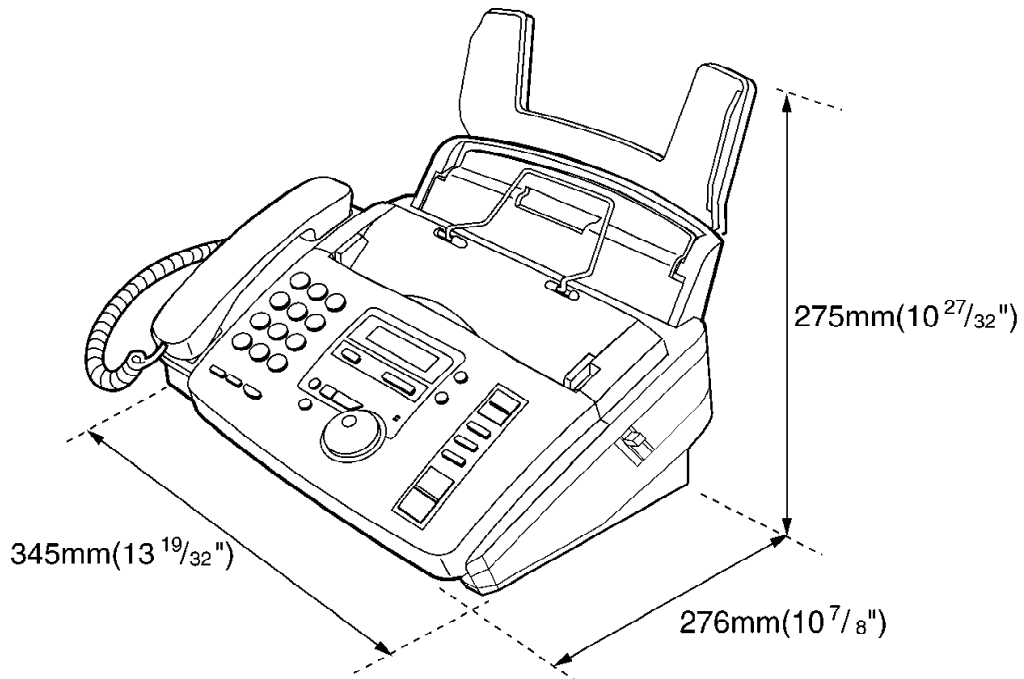
A RS232C cable less than 3 meters long (DB9 Female/DB25 Male) is required to connect to a personal computer.

1.14. INSTALLATION

1.14.1. INSTALLATION SPACE

The space required to install the unit is shown below.

The dimensions given are necessary for the unit to operate efficiently.

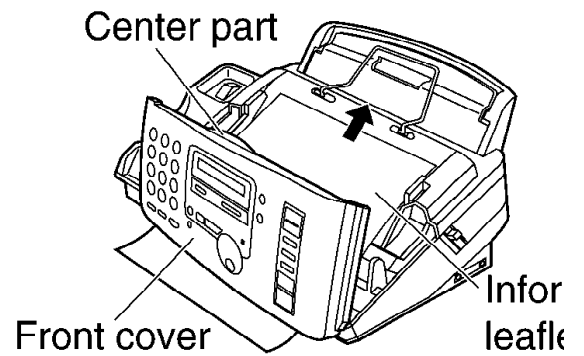


Note:

- **Avoid excessive heat or humidity.**
- **Use the unit within the following ranges of temperature and humidity.**
- **Ambient temperature: 5°C to 35°C**
- **Relative humidity: 20% to 80% (without condensation)**
- **Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage or cause malfunctions.**
- **Avoid direct sunlight.**
- **Do not install near devices which contain magnets or generate magnetic fields.**
- **Do not subject the unit to strong physical shock or vibration.**
- **Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.**
- **To protect the unit from damage, hold both sides when you move it.**

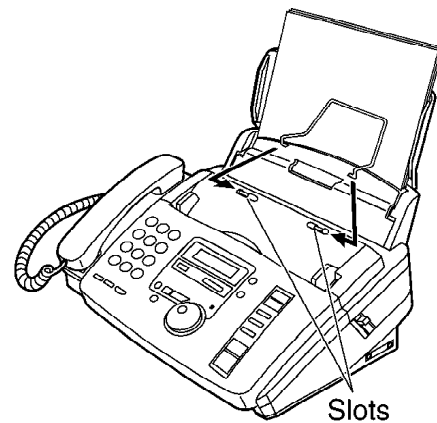
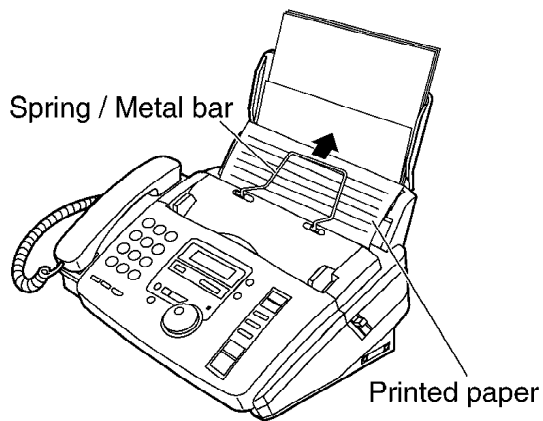
1.14.2. REMOVING THE INFORMATION LEAFLET

Open the front cover by pulling up the center part.
Remove and read the information leaflet, then close
the front cover securely.



1.14.3. INSTALLING THE SPRING / METAL BAR

The recording paper will be ejected from the top of the unit after printing. The metal bar prevents the printed paper from curling. Do not remove the spring / metal bar.
If the bar comes off, attach it into the slots on the recording paper exit.

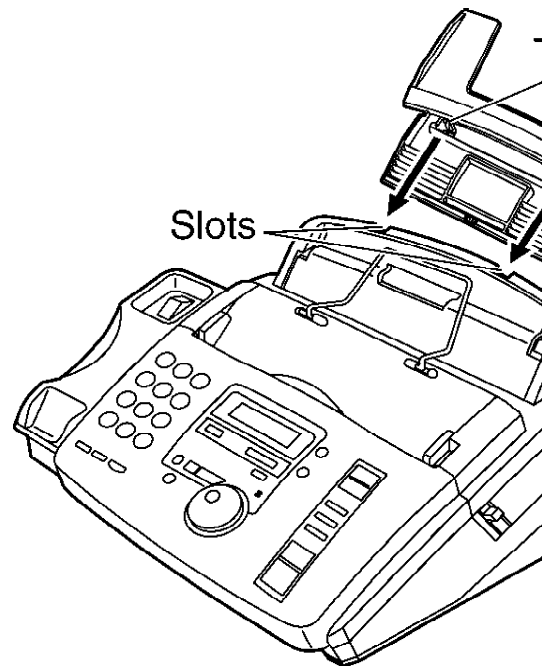


1.14.4. INSTALLING THE PAPER TRAY

Insert the tabs on the paper tray into the slots on the back of the unit.

Note:

- Do not place the unit in areas where the paper tray may be obstructed by a wall, etc.

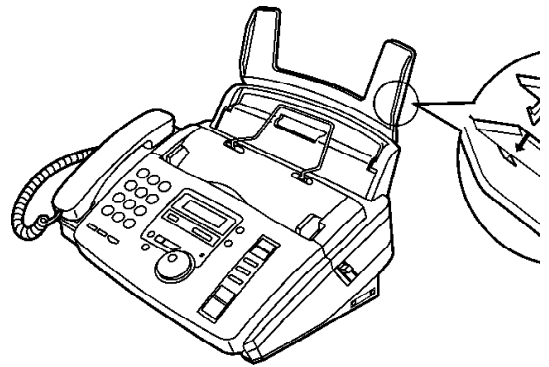


To use A4 size paper

You need to install the A4 paper guide to the right side of the paper tray.

1. Insert the bottom tab on the A4 paper guide into the lower slot.
2. Press the guide into the upper slot.

-Change the recording paper size. [Refer to feature #16 on [PROGRAM MODE TABLE](#) ()]



1.14.5. INSTALLING THE RECORDING PAPER

Letter* or A4** size recording paper can be loaded. The unit can hold up to 50 sheets of 60 g/m² to 75 g/m² (16 lb. to 20lb.) paper or 30 sheets of 90 g/m² (24 lb.) paper.

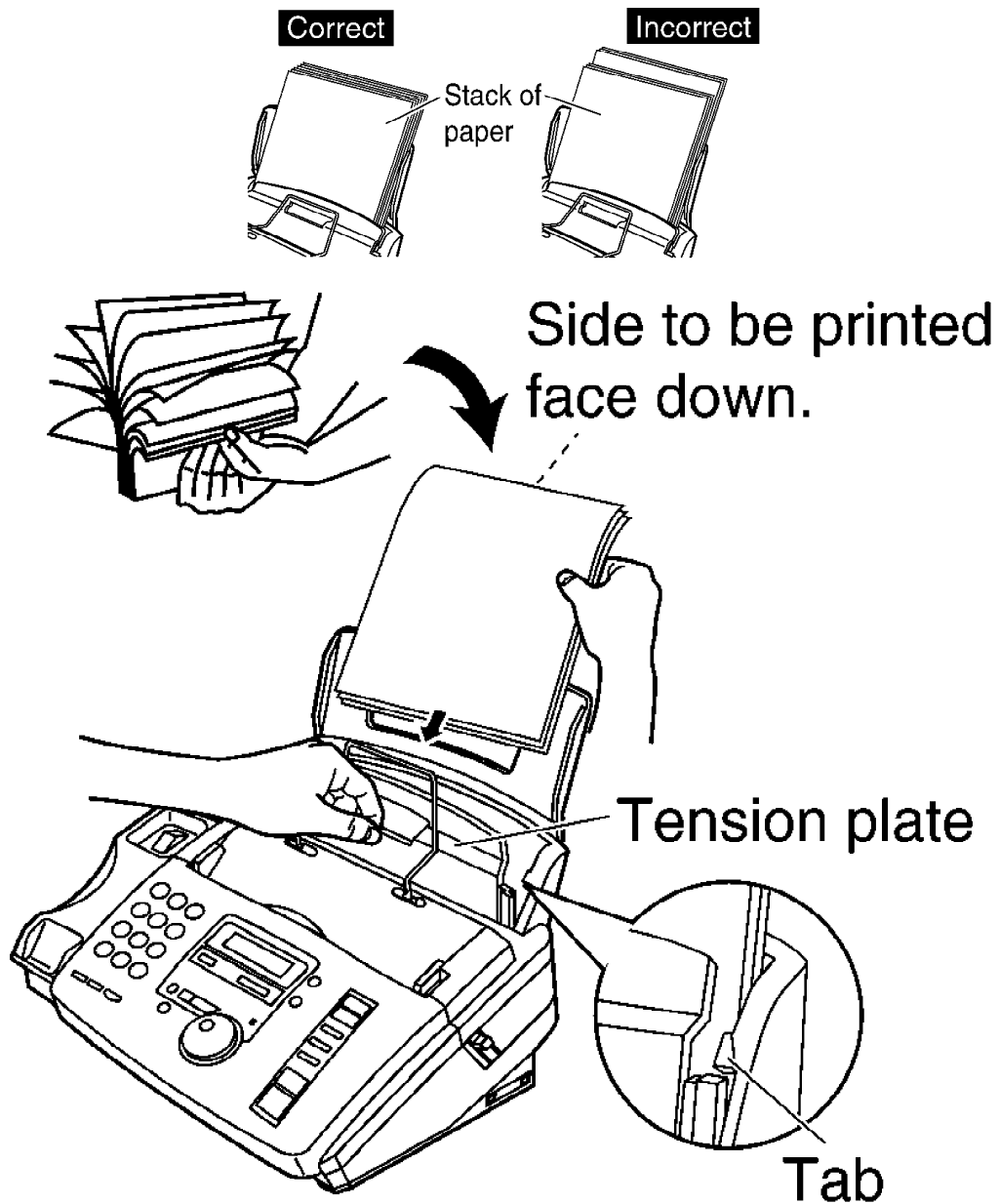
*Letter=216 mm x 279 mm (8 1/2" x 11")

**A4=210 mm x 297 mm (8 1/4" x 11 11/16")

To use A4 size paper, install the A4 paper guide to the paper tray. (Refer to [INSTALLING THE PAPER TRAY](#)().)

1. Fan the stack of paper to prevent a paper jam.
2. Pull the tension plate forward and hold open while inserting the paper.

- The paper should not be over the tab.
- If the paper is not inserted correctly, readjust the paper or the paper may jam.



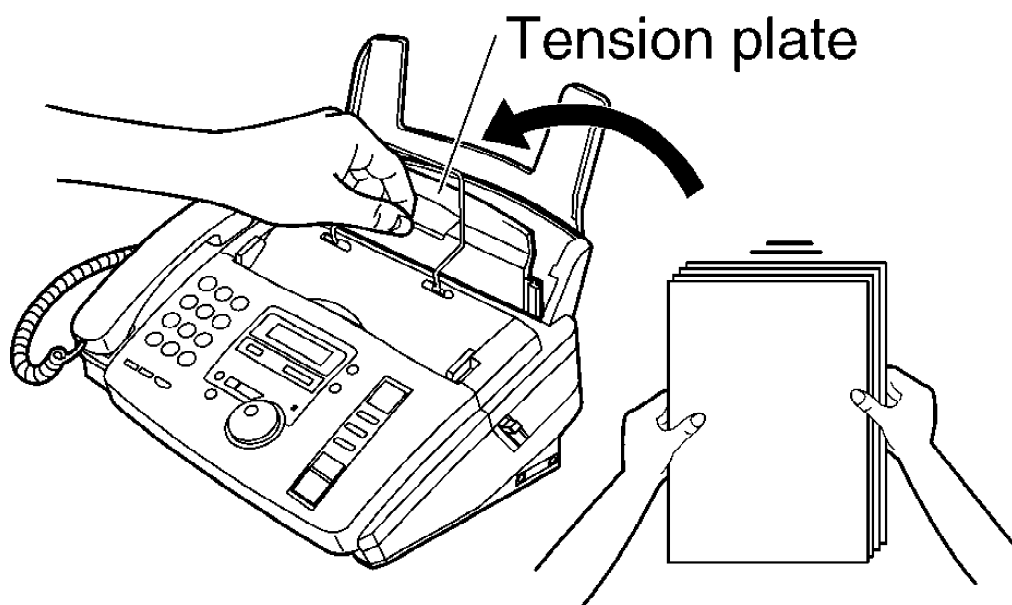
Note:

- Do not use the following types of paper:
- Paper with a cotton and / or fiber content that is over 20%, such as letterhead paper or paper used for resumes.
- Extremely smooth or shiny paper, or paper that is highly textured.
- Coated, damaged or wrinkled paper.
- Paper with irregularities, such as tabs or staples.
- Paper which has dust, lint, or oil stains.
- Paper that will melt, vaporize, discolor, scorch or emit dangerous fumes, near 200°C, such as vellum paper.
- Moist paper

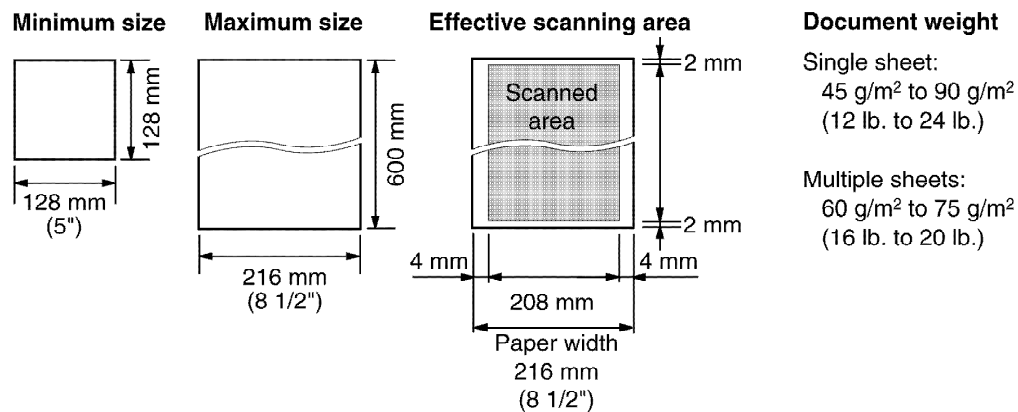
- Some paper only accepts print on one side. Try using the other side of the paper if you are not happy with the print quality or if misfeeding occurs.
- For proper feeding and best print quality, we recommend using long-grained paper.
- Do not use paper of different types or thickness at the same time. This may cause a paper jam.
- Avoid double-sided printing.
- Do not use paper printed from this unit for double-sided printing with other copiers or printers. This may cause a paper jam.
- To avoid curling, do not open paper packs until you are ready to use the paper. Store unused paper in the original packaging, in a cool and dry location.

1.14.6. ADDING PAPER TO THE PAPER TRAY

1. Pull the tension plate forward and hold open while removing all of the installed paper.
2. Add paper to the stack of paper you removed and straighten.
3. Fan the stack of paper.
4. Pull the tension plate forward and hold open while inserting the paper.



1.14.7. DOCUMENTS THE UNIT CAN FEED



Note:

- Remove chips, staples or other similar fasteners.
- Check that ink, paste or correction fluid has dried.
- Do not send the following types of documents. (Use copies for fax transmission.)
 - Chemically treated paper such as carbon or carbon less duplicating paper
 - Electrostatically charged paper
 - Badly curled, creased or torn paper
 - Paper with a coated surface
 - Paper with a faint image
 - Paper with printing on the opposite side that can be seen through the front (e.q. newspaper)
- To transmit the document(s) with a width of less than A4 size(210 mm), we recommend using a copy machine to copy the original document onto A4 or letter-sized paper, then transmit the copied document.

1.14.8. SETTING YOUR LOGO

The logo can be your company, division or name.

1. Press **MENU**.

Display:

1 . SYSTEM SET UP

2. Press **#**, then **0 2**.

YOUR LOGO

3. Press **SET**.

LOGO=

4. Enter your logo, up to 30 characters, by using the dial keypad.
Example: Bill

A. Press **2** twice.

LOGO=B

Cursor

B. Press **4** six times.

LOGO=Bi

C. Press **5** six times.

LOGO=Bill

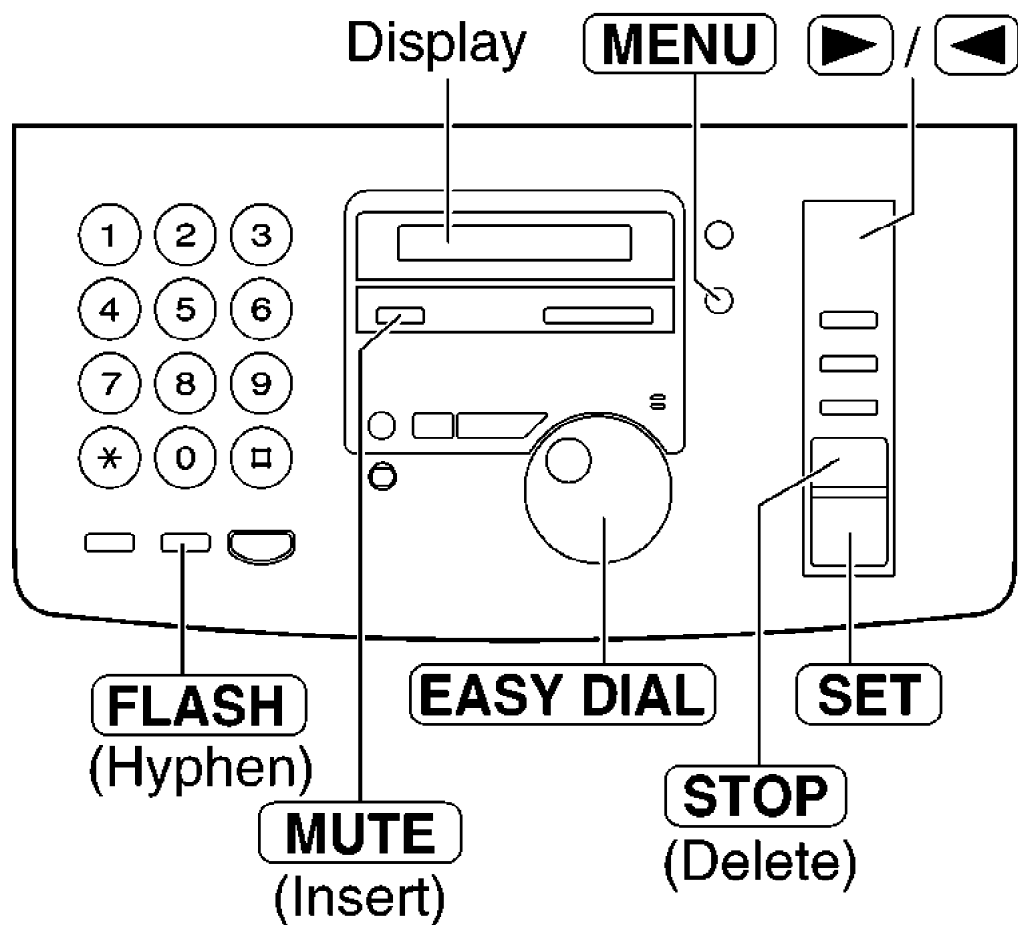
D. Press **▶** to move the cursor to the next space and press **5** six times.

LOGO=Bill

5. Press **SET**.

SETUP ITEM []

6. Press **MENU**.



Note:

- You can enter your logo by rotating **EASY DIAL**.

To correct a mistake

-Press **▶** or **◀** to move the cursor to the incorrect character, and make the correction.

To delete a character



-Move the cursor to the character you want to delete and press **STOP**.

To insert a character

1. Press **▶** or **◀** to move the cursor to the position to where you want to insert the character.
2. Press **MUTE** (Insert) to insert a space and enter the


1.14.9. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

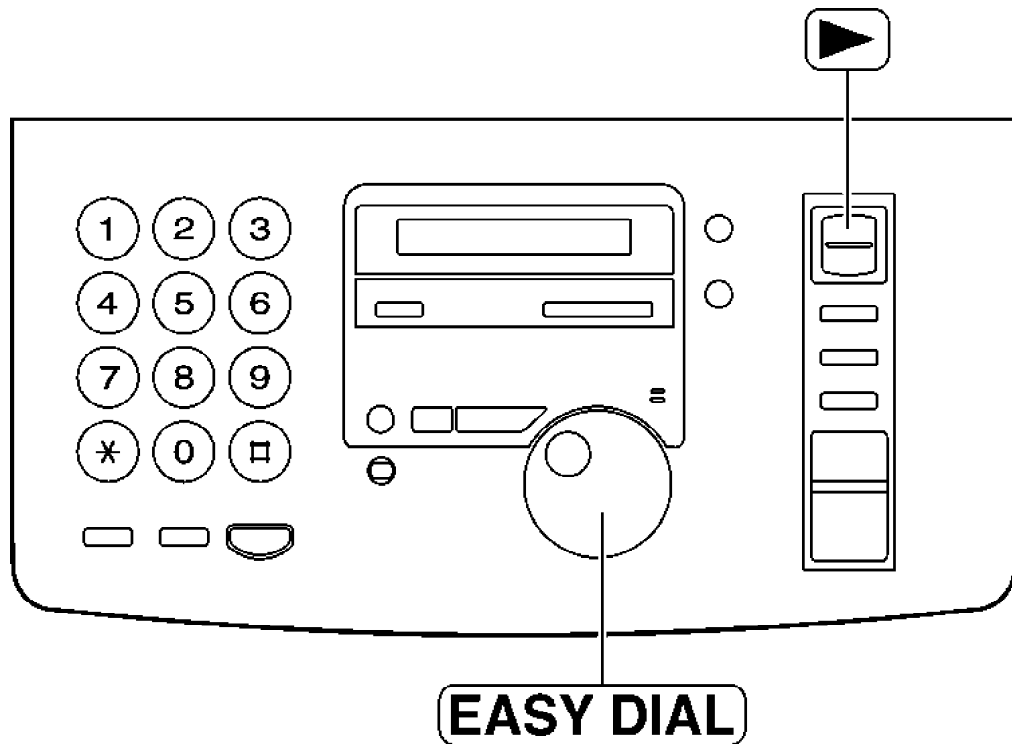
Pressing the dial keys will select a character as shown below.

Keys	Characters
①	1 [] { } + - / = , . _ ` : ; ?
②	A B C a b c 2
③	D E F d e f 3
④	G H I g h i 4
⑤	J K L j k l 5
⑥	M N O m n o 6
⑦	P Q R S p q r s 7
⑧	T U V t u v 8
⑨	W X Y Z w x y z 9
⑩	0 () < > ! " # \$ % & ¥ * @ ^ ' →
FLASH	Hyphen button (To insert a hyphen.)
MUTE	Insert button (To insert one character or one space.)
STOP	Delete button (To delete a character.)
	► key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
	◄ key (To move the cursor to the left.)

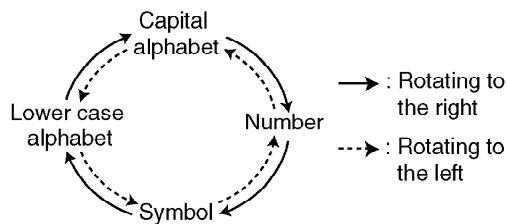
1.14.10. TO SELECT CHARACTERS USING THE EASY DIAL

Instead of pressing the dial keys, you can select characters using the EASY DIAL.

1. Rotate **EASY DIAL** until the desired character is displayed.
2. Press  to move the cursor to the next space.
 - The character displayed in step 1 is inserted.
3. Return to step 1 to enter the next character.



Display order of characters



1.14.11. REPLACING THE FILM CARTRIDGE

When the unit runs out of ink film, the following message will be displayed.

Display:

CHECK FILM

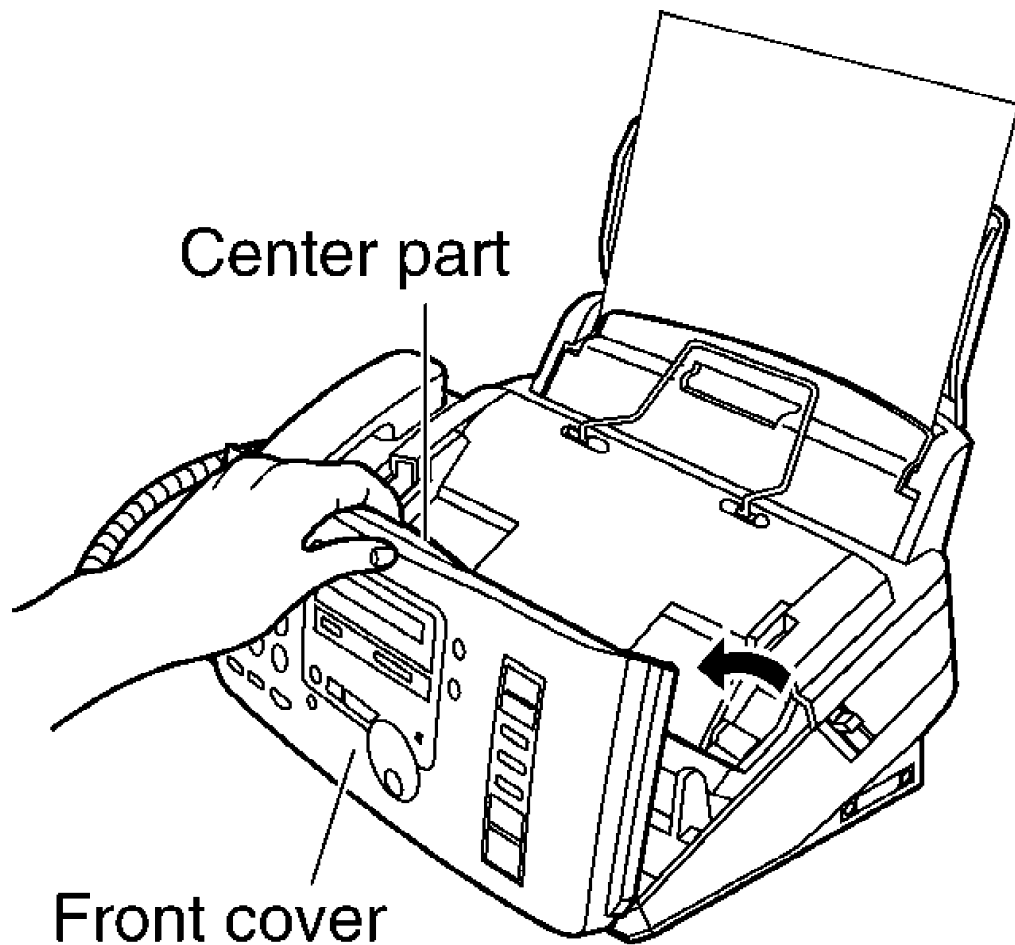
Replace the used ink film with a new one. The following ink films are available for replacement. Each roll prints about 140 A4 size pages or 150 letter size pages.

Refer to **OPTIONAL ACCESSORIES()**.

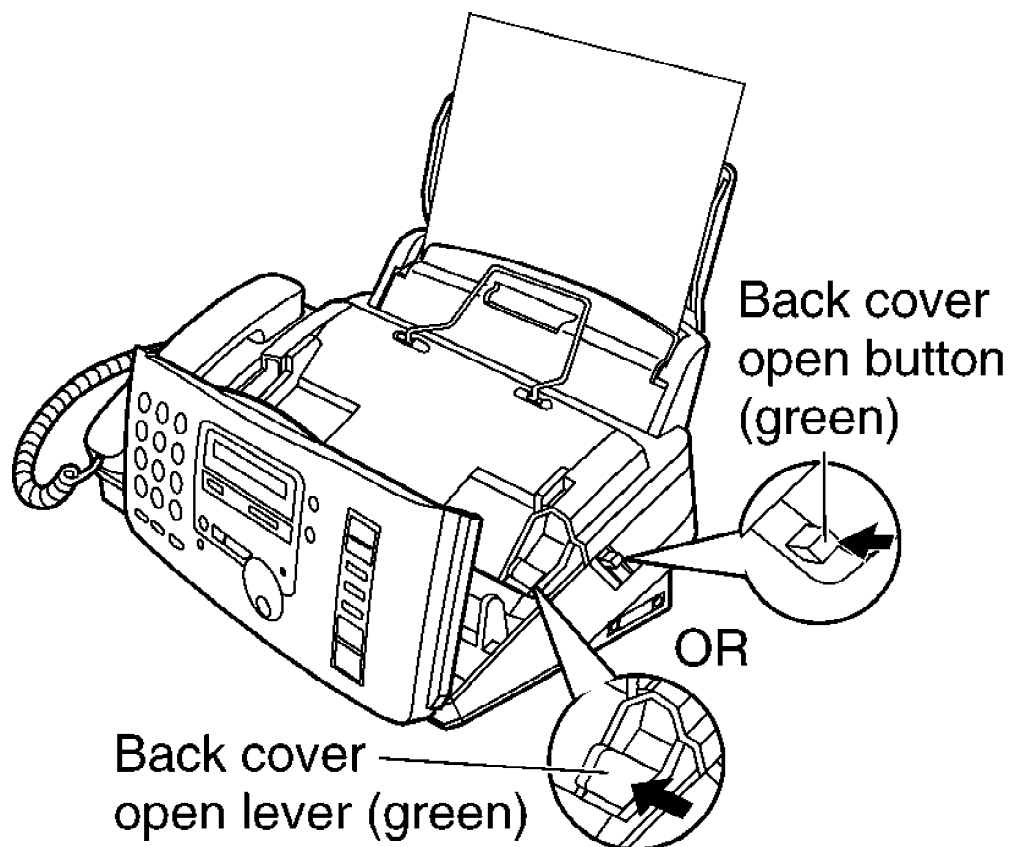
Model No. KX-FA53A: Replacement film (1 roll)

Model No. KX-FA55A: Replacement film (2 rolls)

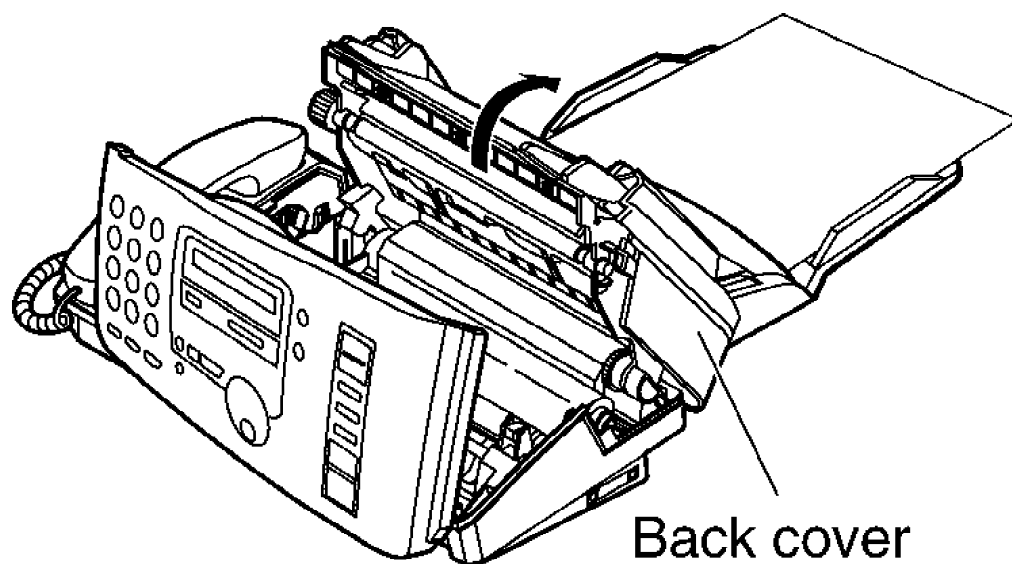
1. Open the front cover by pulling up the center part.



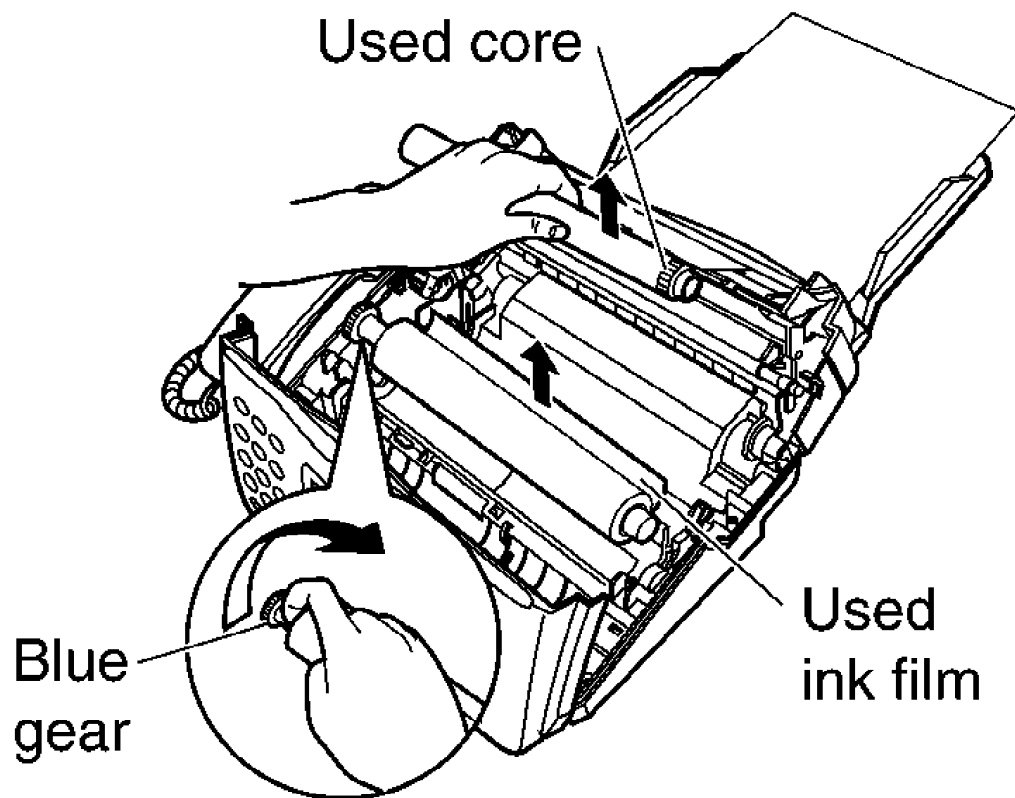
2. Push the back cover open button (green) on the right side of the unit.
OR
Push the back cover open lever (green) inside of the unit.



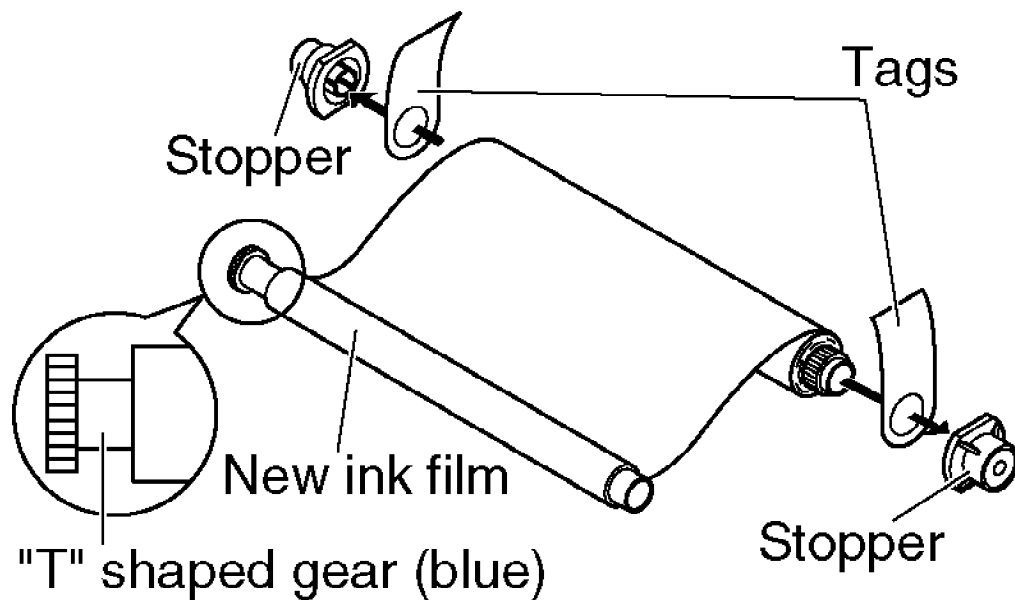
3. Open the back cover.



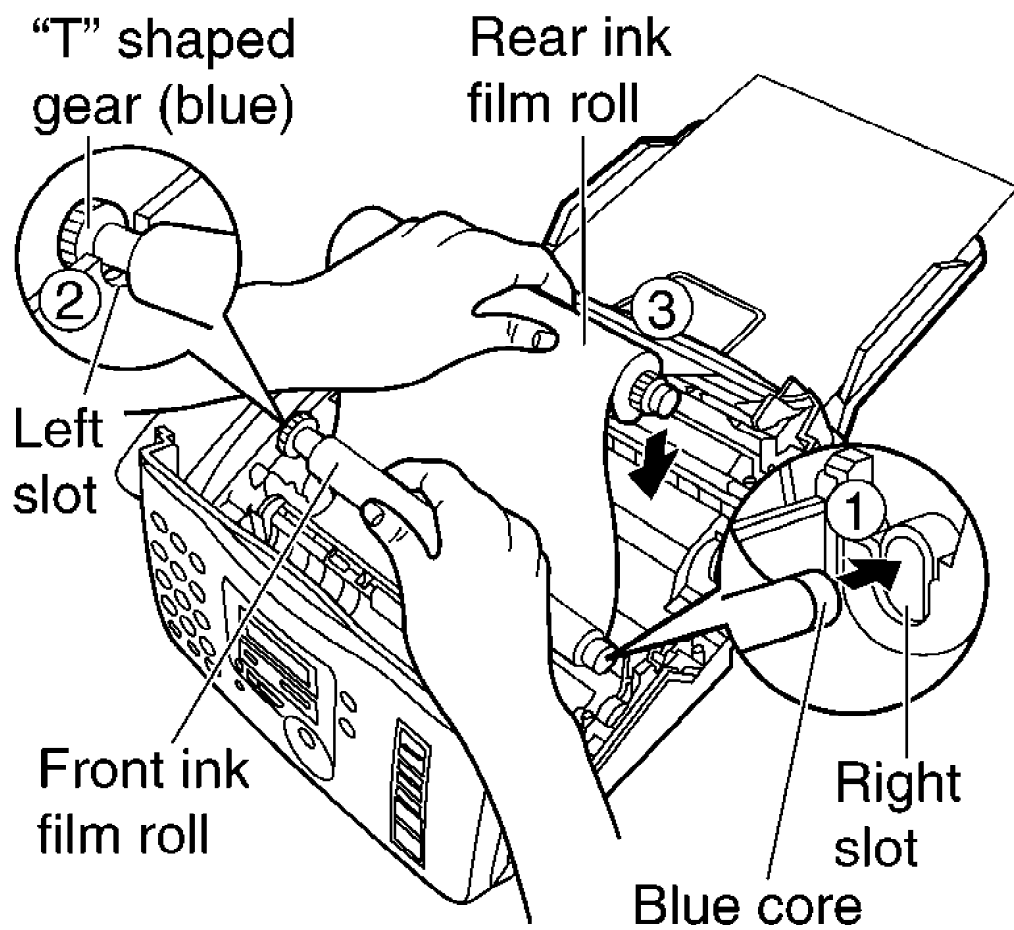
4. Pull out the blue gear side and remove the used ink film. Remove the used core.



5. Remove the stoppers and tags from the new ink film. Find the "T" shaped gear (blue).

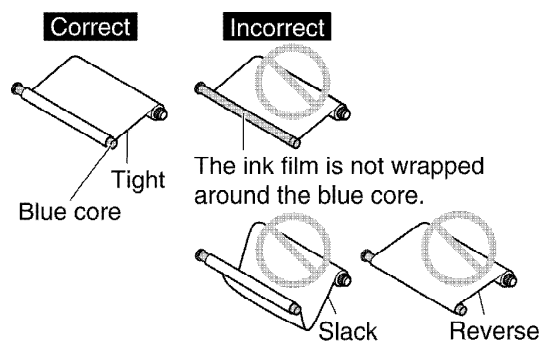


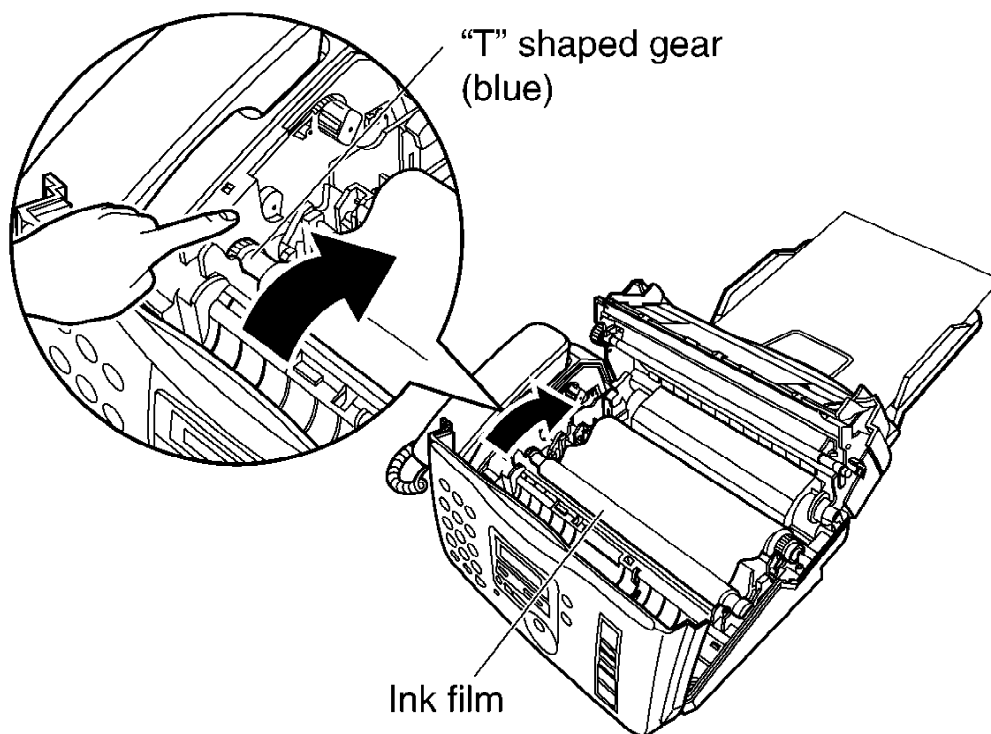
6. Insert the blue core of the front ink film roll into the right slot of the unit (①). Insert the "T" shaped gear (blue) into the left slot of the unit (②).
Insert the back ink film roll (③).



7. Turn the “T” shaped gear (blue) in the direction of the arrow.

- Make sure that the ink film is wrapped around the blue core at least once.





8. Close the back cover securely by pushing down on the dotted area at both ends (①).

Close the front cover securely (②).

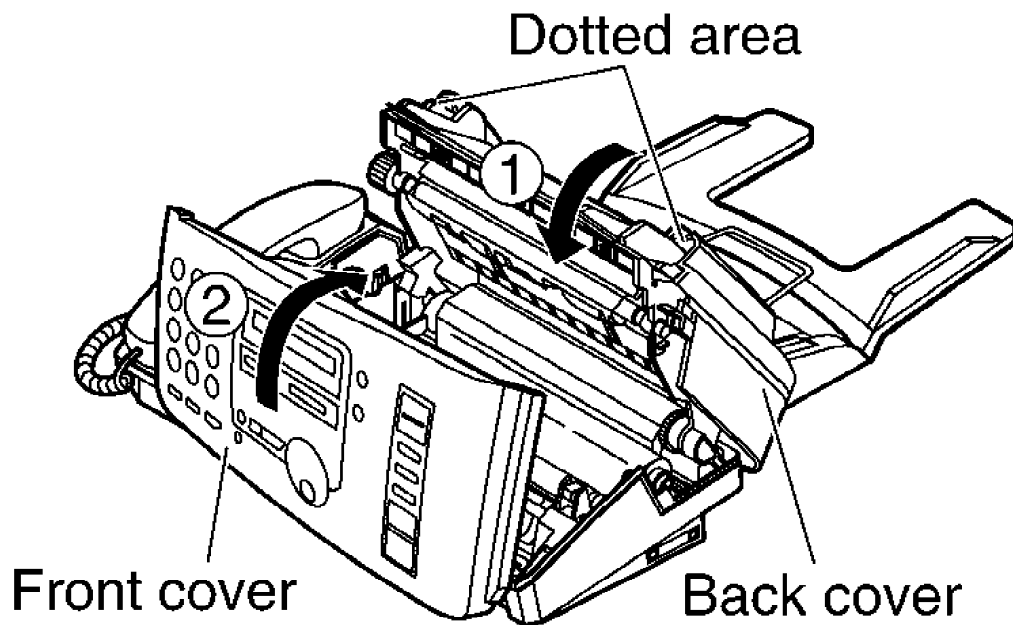
- The following message will be displayed while the unit is checking that there is no slack on the ink film.

Display:

PLEASE WAIT

Note:

- The ink film is completely safe to touch, and will not rub off on your hands like carbon paper.



1.15. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1.15.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

1. Periodic maintenance

Inspect the equipment periodically and if necessary, clean any contaminated parts.

2. Check for breakdowns

Look for problems and consider how they arose.

If the equipment can be still used, perform copying, self testing or communication testing.

3. Check equipment

Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.

4. Determine causes

Determine the causes of the equipment problem by troubleshooting.

5. Equipment repairs

Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.

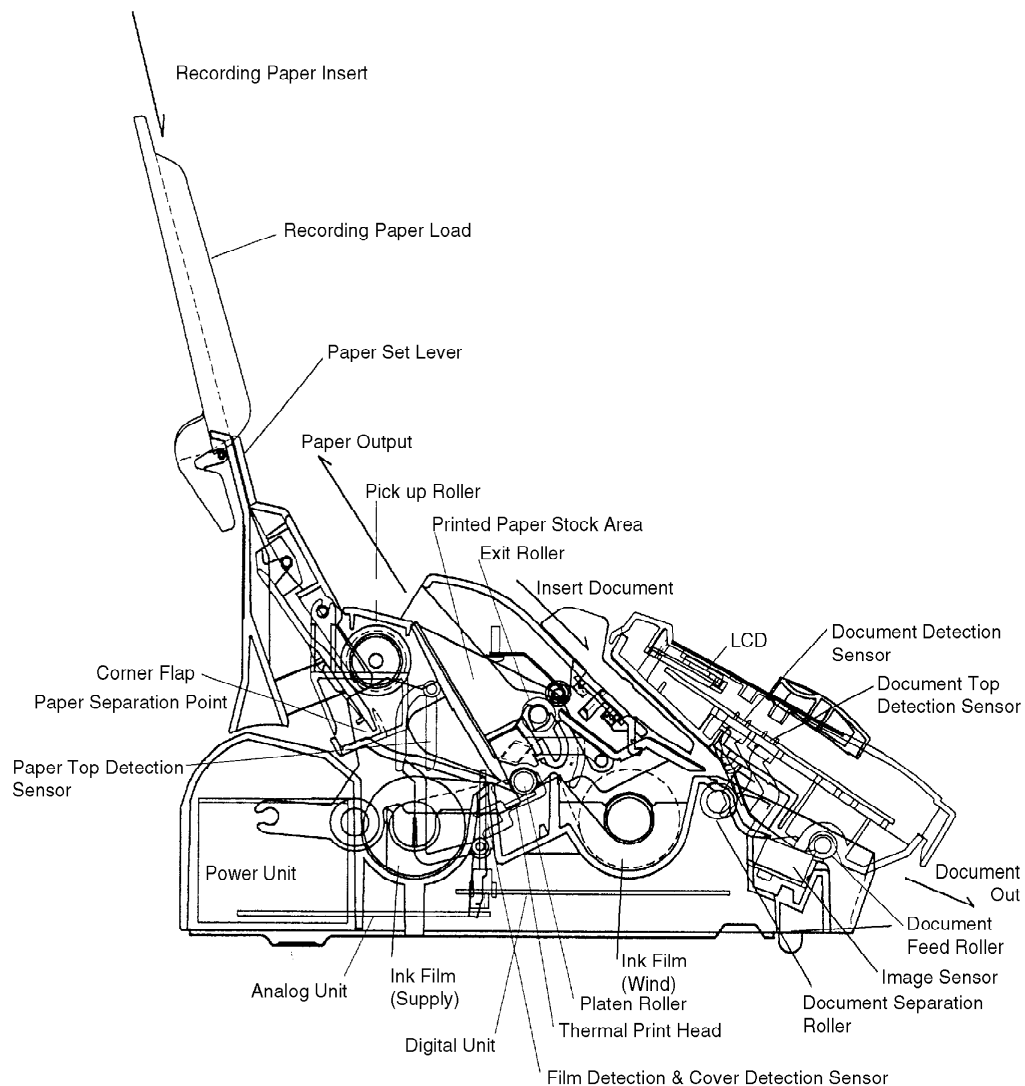
6. Confirm normal operation of the equipment

After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates normally.

7. Record keeping

Make a record of the measures taken to rectify the problem for future reference.

1.15.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS



1.15.2.1. MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	Refer to MAINTENANCE (
3	Platen Roller	If the platen is dirty, clean it with a damp cloth then dry thoroughly. Remove the paper and film cartridge before cleaning.	—
4	Thermal Head	If the thermal head is dirty, clean the printing surface with a cloth moistened with denatured alcohol (alcohol without water), then dry thoroughly.	Refer to MAINTENANCE (
5	Sensors	Hook switch (SW101), Paper top sensor (PS501), Film end/Cover open switch (SW501), Document top switch (SW353), Document set switch (SW352). Confirm the operation of the sensors.	See MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS() and HOW TO REMOVE THE ANALOG, DIGITAL AND POWER BOARDS AND AC INLET
6	Glass	If the glass is dirty, clean them with a dry soft cloth.	Refer to MAINTENANCE (
7	Abnormal, wear and tear or loose parts	Replace the part. Check if the screws are tight on all parts.	—

1.15.2.2. MAINTENANCE CYCLE

No.	Item	Cleaning Cycle	Replacement	
			Cycle	Procedure
1	Separation Roller (Ref. No. 117)	3 months	7 years* (100,000 documents)	Refer to HOW TO REMOVE THE SEPARATION ROLLER
2	Separation Rubber (Ref. No. 5)	3 months	7 years (100,000 documents)	Refer to MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS() .
3	Feed Rollers (Ref. No. 4)	3 months	7 years (100,000 documents)	Refer to DISASSEMBLY INSTRUCTIONS
4	Thermal Head (Ref. No. 33)	3 months	7 years (100,000 documents)	Refer to HOW TO REMOVE THE THERMAL HEAD() .
5	Platen Roller (Ref. No. 93)	3 months	7 years (100,000 documents)	Refer to HOW TO REMOVE THE PLATEN ROLLER, BACK COVER() .
6	Pickup Roller (Ref. No. 72)	3 months	7 years (100,000 documents)	Refer to HOW TO REMOVE THE PICKUP ROLLER() .

1.15.3. MAINTENANCE

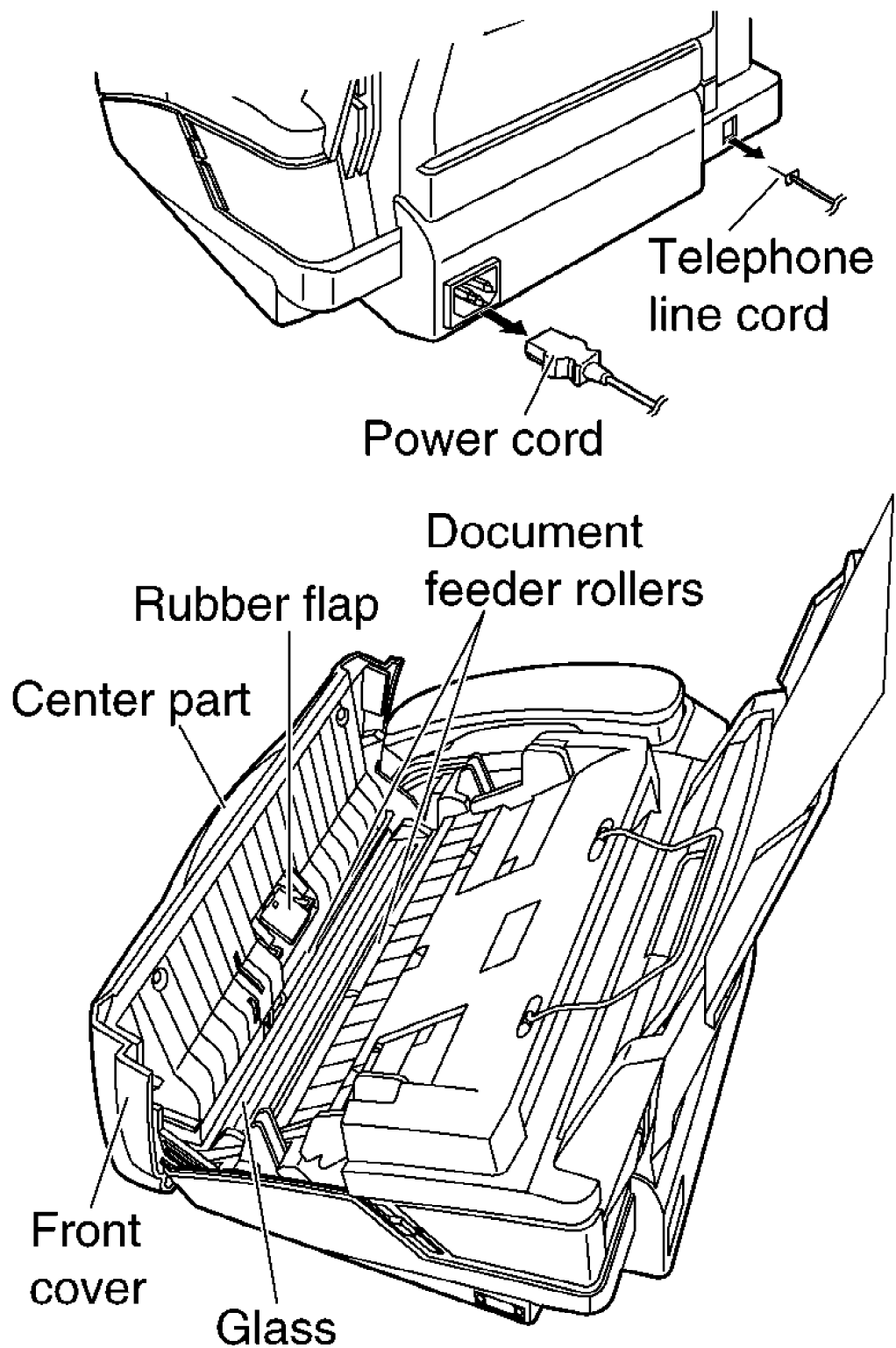
1.15.3.1. CLEANING THE DOCUMENT FEEDER UNIT

If misfeeding occurs frequently or if dirty patterns or black bands appear on a transmitted document or on the original of a copied document, clean the document feeder.

- 1. Disconnect the power cord and the telephone line cord.**
- 2. Open the front cover by pulling up the center part.**
- 3. Clean the document feed rollers and rubber flap with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly.**
- 4. Clean the glass with a soft dry cloth.**
- 5. Close the front cover securely.**
- 6. Connect the power cord and the telephone line cord.**

Caution:

- Do not use paper products, such as paper towels or tissues, to clean the inside of the unit.**



1.15.3.2. CLEANING THE THERMAL HEAD AND BLACK BAR

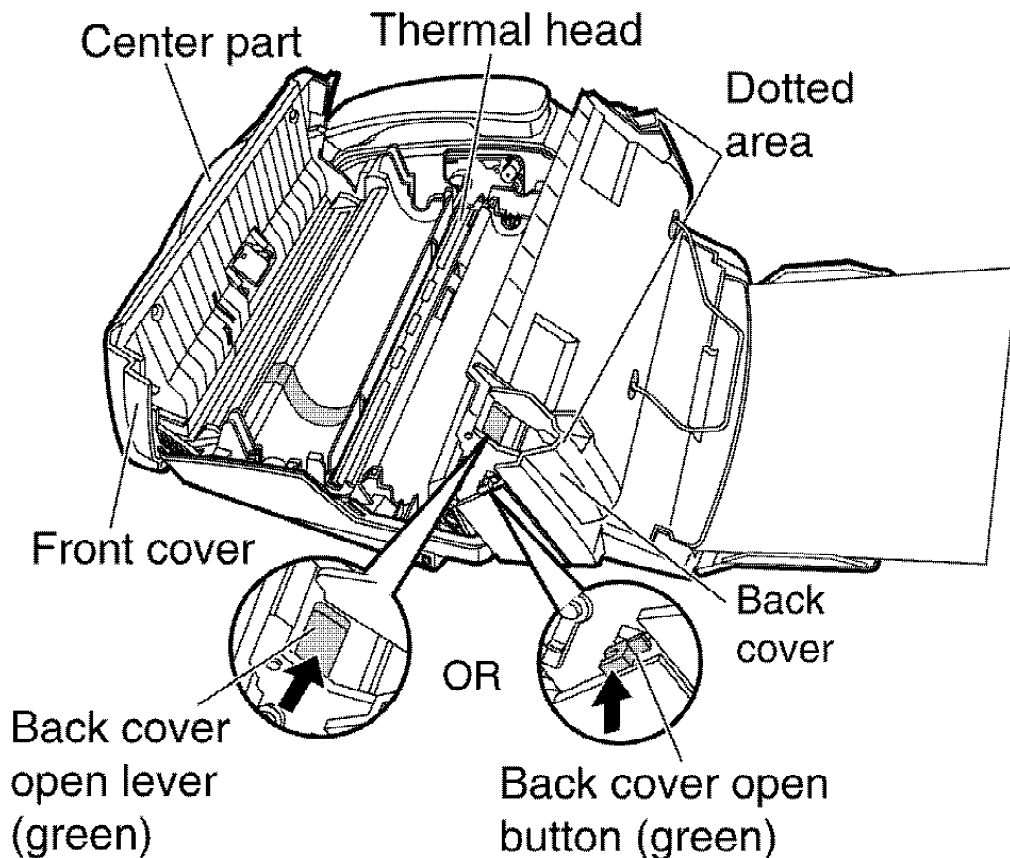
If dirty patterns or black or white bands appear on a copied or received document, clean the thermal head.

1. Disconnect the power cord and the telephone line cord.

2. Open the front cover by pulling up the center part.
3. Open the back cover by pushing the back cover open button.
4. Clean the thermal head with a cloth moistened with isopropyl rubbing alcohol, and let it dry thoroughly.
5. Close the back cover securely by pushing down on the dotted area at both ends. Close the front cover securely.
6. Connect the power cord and the telephone line cord.

Caution:

- To prevent a malfunction due to static electricity, do not use a dry cloth and do not touch the thermal head directly with your fingers.



1.15.3.3. CLEANING THE PICKUP ROLLER

Refer to **HOW TO REMOVE THE PICKUP ROLLER.**()

2. TROUBLESHOOTING GUIDE

2.1. TROUBLESHOOTING SUMMARY

2.1.1. TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

2.1.2. PRECAUTIONS

1. If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.
2. Before troubleshooting, first check that the connectors and cables are connected correctly (not loose).
If the problem occurs randomly, check it very carefully.
3. When connecting the AC power cord with the unit and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.
4. After troubleshooting, double check that you have not forgotten any connectors, left any loose screws, etc.
5. Always test to verify that the unit is working normally.


2.1.3. WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

- How to use:

1. press **HELP**.
2. press **EASY DIAL** until the desired item is displayed.
3. press **SET**.

2.2. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display.

DISPLAY MESSAGE	CAUSE AND REMEDY
CALL SERVICE	<p>-There is something wrong with the unit. [This error is displayed when the thermal head does not warm up. Check the thermistor on the thermal connector lead. (for technicians)]</p>
CALL SERVICE2	
CHECK DOCUMENT	-The document was not fed into the unit properly. Reinsert the document. If misfeeding occurs frequently, check the document feeder rollers and try again.
CHECK MEMORY	-Memory (telephone numbers, parameters, etc.) has been erased. Re-program.
CHECK PAPER	<p>-The recording paper is not installed or the unit has run out of paper. Install paper and press SET to clear the message.</p> <p>-The recording paper is not fed into the unit properly. Reinstall paper and press SET to clear the message.</p> <p>-The recording paper has jammed near the recording paper entrance. Clear the jammed paper and press SET to clear the message. Do not install folded or heavily curled paper.</p>
COVER OPEN	<p>-The covers are open. Close them.</p> <p>-The ink film is empty. Replace the ink film with a new one.</p> <p>-The ink film is not installed. Install it.</p> <p>-The ink film is slack. Tighten it.</p>
	
CHECK FILM	
FAX IN MEMORY	-The unit has a document in memory. See the other displayed message instructions to print out the document.
FAX MEMORY FULL	<p>-Memory is full of received documents due to a lack of recording paper or a recording paper jam. Install recording paper and clear the jammed paper.</p> <p>-When performing memory transmission, the document being stored exceeds the memory capacity of the unit. Transmit the entire document manually.</p>
EASY DIAL FULL	-There is no space to store new stations in the directory. Erase unnecessary stations.
MEMORY FULL	-When making a copy, the document being stored exceeds the memory capacity of the unit. Press S to clear the message. Divide the document into sections.
MESSAGE FULL	-There is no room left in memory to record a voice message. Erase unnecessary messages.
MODEM ERROR	-There is something wrong with the modem circuit.
NO FAX REPLY	-The other party's fax machine is busy or has run out of recording paper. Try again.
PAPER JAMMED	<p>-A recording paper jam occurred. Clean the jammed paper.</p> <p>[If the printout jams, please refer to RECORDING PAPER JAMS (.)]</p>
PC FAIL OR BUSY	<p>-The cable or the PC power cord is not connected correctly. Check the connections. (Refer to CONNECTING TO A PC (.)]</p> <p>-The software is not running on the PC. Restart the software and try again.</p>
PLEASE WAIT	-The unit is checking that there is no slack on the ink film. Wait for a while.
POLLING ERROR	-The other party's fax machine does not provide the polling function. Check with the other party.
REDIAL TIME OUT	-The other party's fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT	<p>-The document is jammed. Remove the jammed document.</p> <p>-Attempted to transmit a document longer than 600 mm (23 5/8"). Press the STOP to remove the document. Divide the document into two or more sheets and try again.</p> <p>-[Alternately, turn off service code #559 to enable sending of documents longer than 600 mm] (Refer to DOCUMENT JAMS-SENDING (.)]</p>
TRANSMIT ERROR	-A transmission error occurred. Try again.

DISPLAY MESSAGE	CAUSE AND REMEDY
UNIT OVERHEATED	-The unit is too hot. Let the unit cool down.

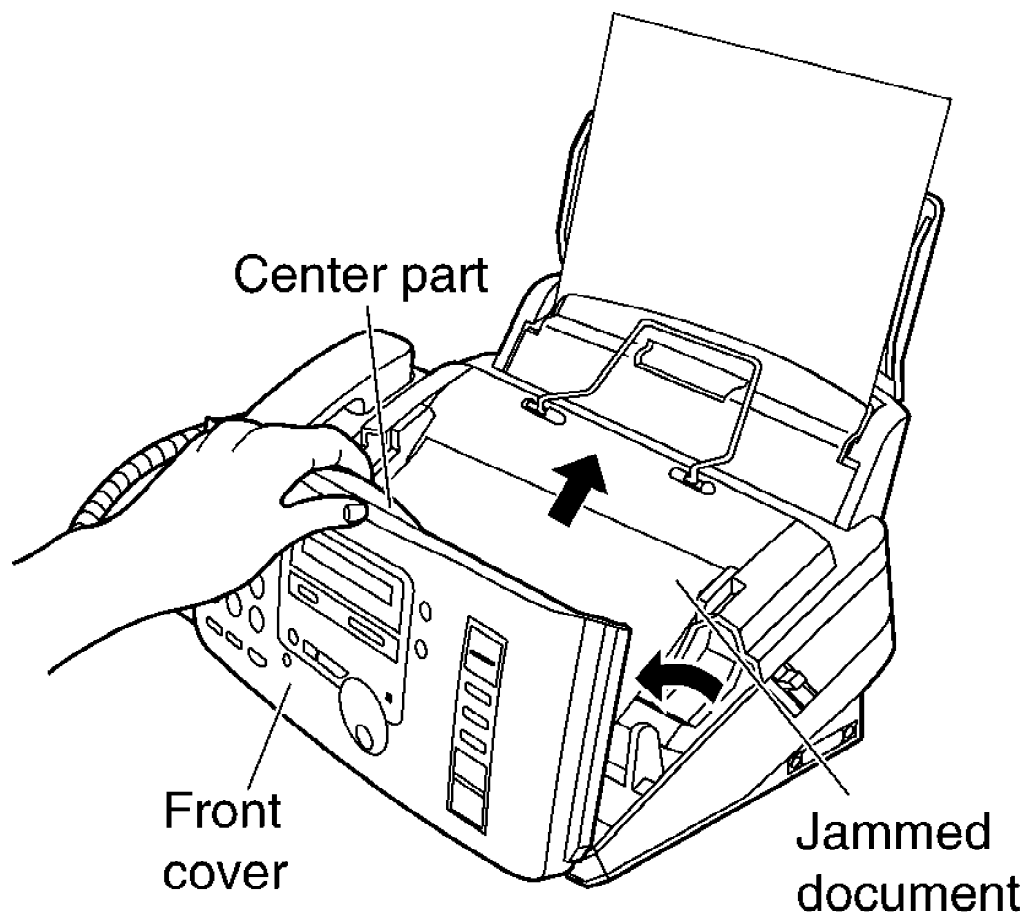
Note:

The explanations given in the [] are for servicemen only.

2.2.1. DOCUMENT JAMS-SENDING

If the unit does not release the document during feeding, remove the jammed document as follows.

1. Open the front cover by pulling up the center part.
2. Remove the jammed document carefully.
3. Close the front cover securely.



Note:

- Do not pull out the jammed paper forcibly before opening the front cover.



2.2.2. RECORDING PAPER JAMS

If the unit does not eject any recording paper during reception or copying, the recording paper has jammed and the display will show the following message.

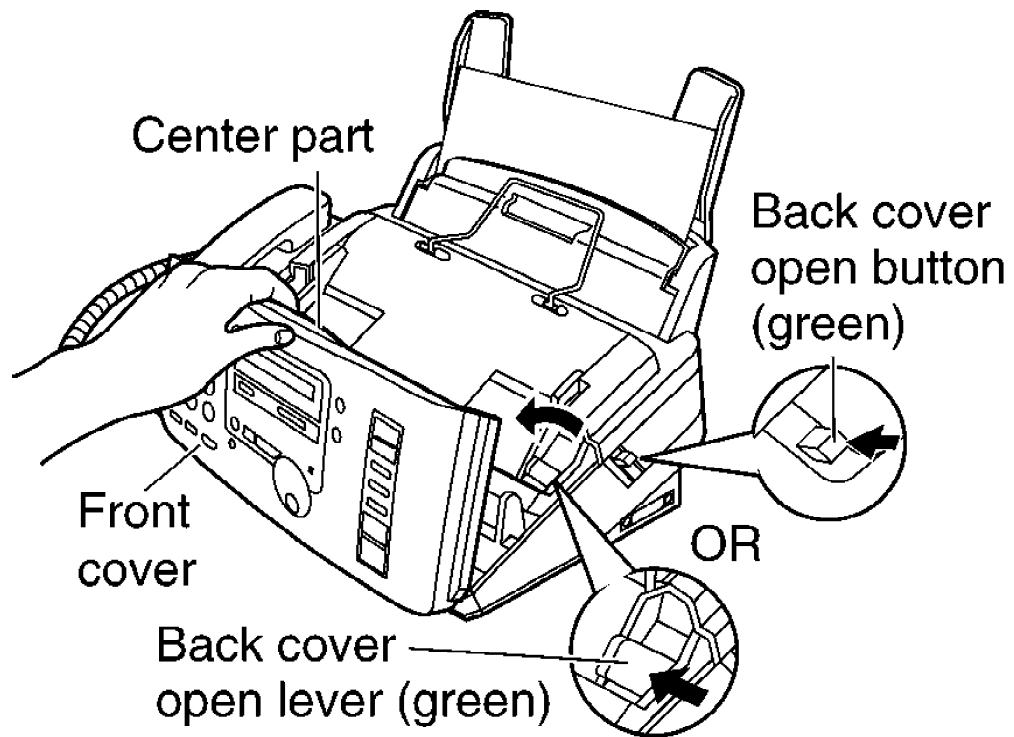
When paper has jammed under the film cartridge

Display:

PAPER JAMMED

Remove the jammed paper as follows.

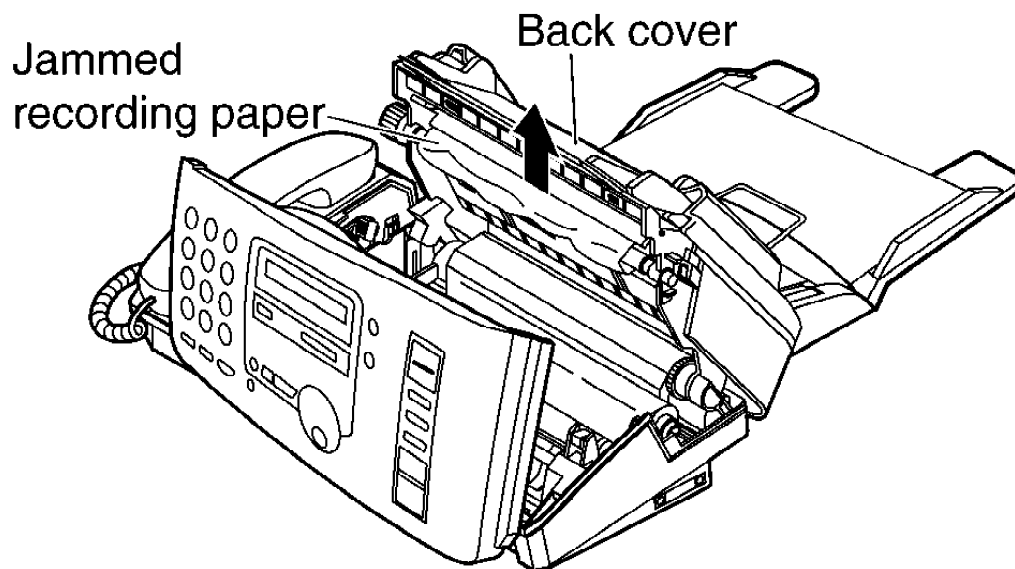
1. Open the front cover by pulling up the center part.



2. Push the back cover open button (green) on the right side of the unit.

OR

Push the back cover open lever (green) inside of the unit.

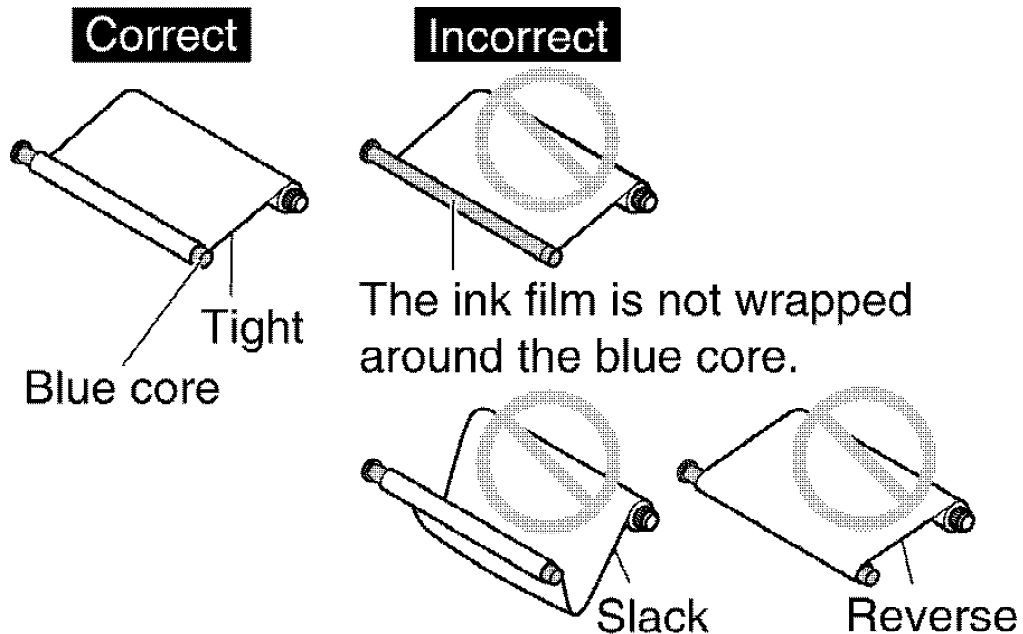


3. Open the back cover.

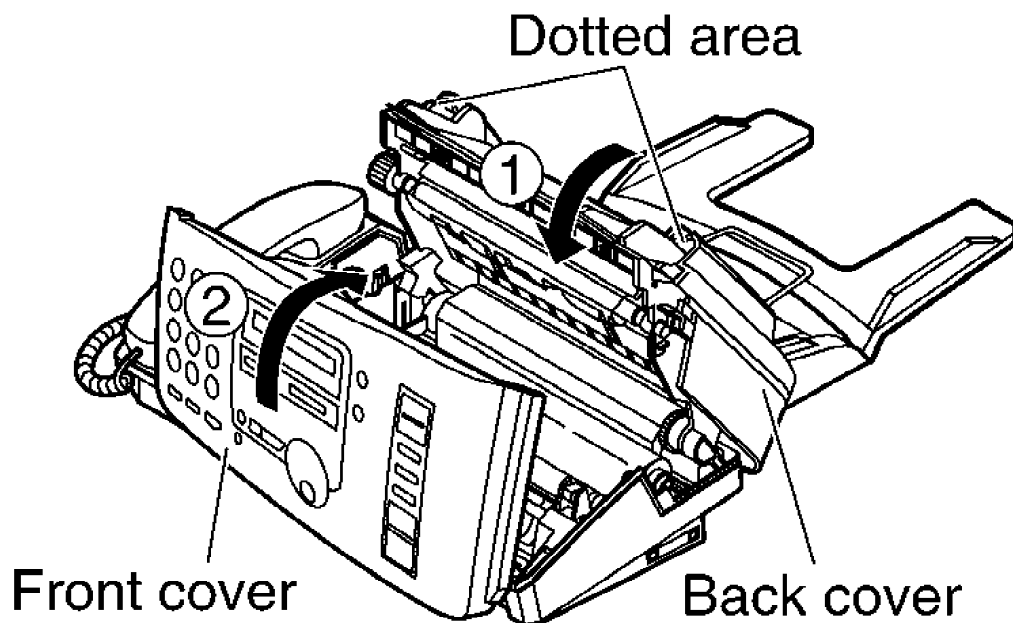
4. Remove the jammed recording paper.

5. Turn the “T” shaped gear (blue) in the direction of the arrow.

- Make sure that the ink film is wrapped around the blue core at least once.



6. Close the back cover securely by pushing down on the dotted area at both ends (①).
Close the front cover securely (②).



2.3. TROUBLESHOOTING DETAILS

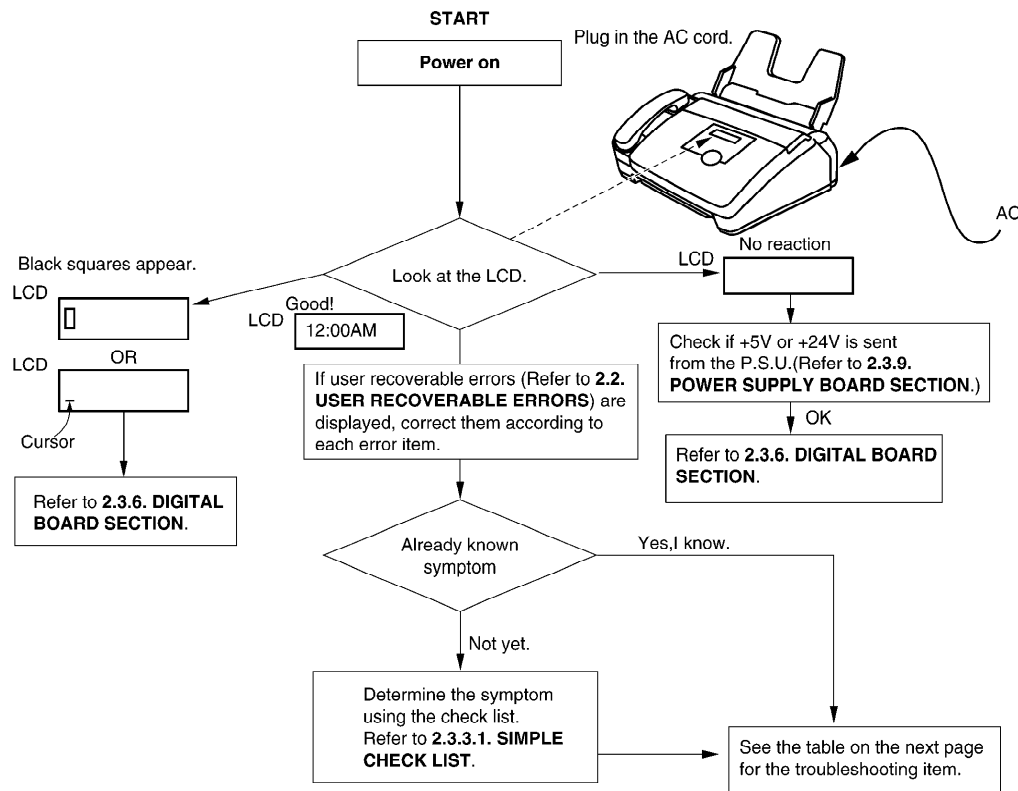
2.3.1. OUTLINE

Troubleshooting is for recovering quality and reliability by determining the broken component

and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on **SIMPLE CHECK LIST()**. Difficult problems may be hard to determine, so repeated testing is necessary.

2.3.2. STARTING TROUBLESHOOTING

Determine the symptom and the troubleshooting method.



CROSS REFERENCE:

USER RECOVERABLE ERRORS()

SIMPLE CHECK LIST()

DIGITAL BOARD SECTION()

POWER SUPPLY BOARD SECTION()

2.3.3. TROUBLESHOOTING ITEMS TABLE

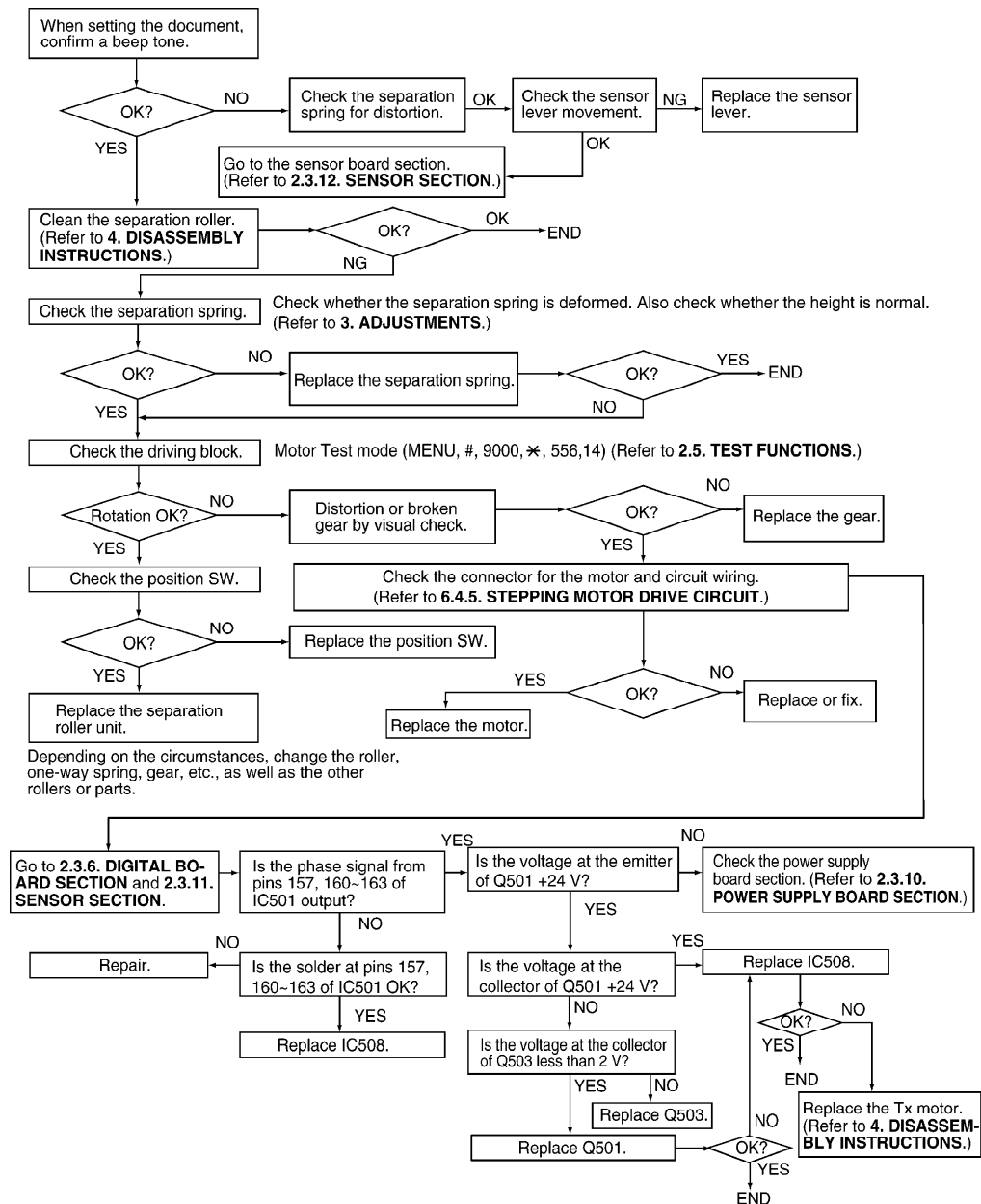
ITEM	SYMPTOM	REFERENCE
ADF (Auto Document Feeder)	The document does not feed. Document jam Multiple feed Skew	See ADF (Auto Document SECTION)
Recording paper feed	The recording paper does not feed. Paper jam Multiple feed and skew	See ADF (Auto Document SECTION)
Printing	The sent fax data is skewed. The received fax data is skewed. The received or copied data is expanded. A blank page is received. Black or white vertical line Black or white lateral line An abnormal image is printed	See ADF (Auto Document SECTION)
Communication FAX, TEL (analog board)	Cannot communicate by fax. An error code is displayed.	See COMMUNICATION SE
	Cannot talk. The DTMF tone doesn't work. The handset / monitor doesn't work, etc.	See ANALOG BOARD SEC
Operation panel	Keys are not accepted.	See OPERATION PANEL S ()
Sensor	If the electric circuit is the cause, the error message corresponding to the sensor will be displayed.	See SENSOR SECTION ()

2.3.3.1. SIMPLE CHECK LIST

SERIAL NO.		DATE	
	FUNCTION	JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation		OK / NG	
Telephone operation	Handset transceiver / receiver	OK / NG	
	SP-PHONE sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
	VOX detection	OK / NG	Service code #815 (Refer to FUNCTIONS ())
Operation Panel	Key check	OK / NG	Service code #561 (Refer to FUNCTIONS ())
	LED check	OK / NG	Service code #557 (Refer to FUNCTIONS ())
	LCD check	OK / NG	Service code #558 (Refer to FUNCTIONS ())
Sensor	Sensor check	OK / NG	Service code #815 (Refer to FUNCTIONS ())
Clock	Display changing	OK / NG	Is the time kept correctly? Check with another clock.
Digital Speaker phone		OK / NG	
Digital TAM	Greeting REC / PLAY	OK / NG	
	Incoming message REC / PLAY	OK / NG	
	Memo REC / PLAY	OK / NG	
Voice prompt		OK / NG	Service code #784 Check whether voice prompt plays or not.

2.3.4. ADF (Auto Document Feed) SECTION

2.3.4.1. NO DOCUMENT FEED



CROSS REFERENCE:

DIGITAL BOARD SECTION()

POWER SUPPLY BOARD SECTION()

SENSOR SECTION()

TEST FUNCTIONS()

ADJUSTMENTS()

DISASSEMBLY INSTRUCTIONS()

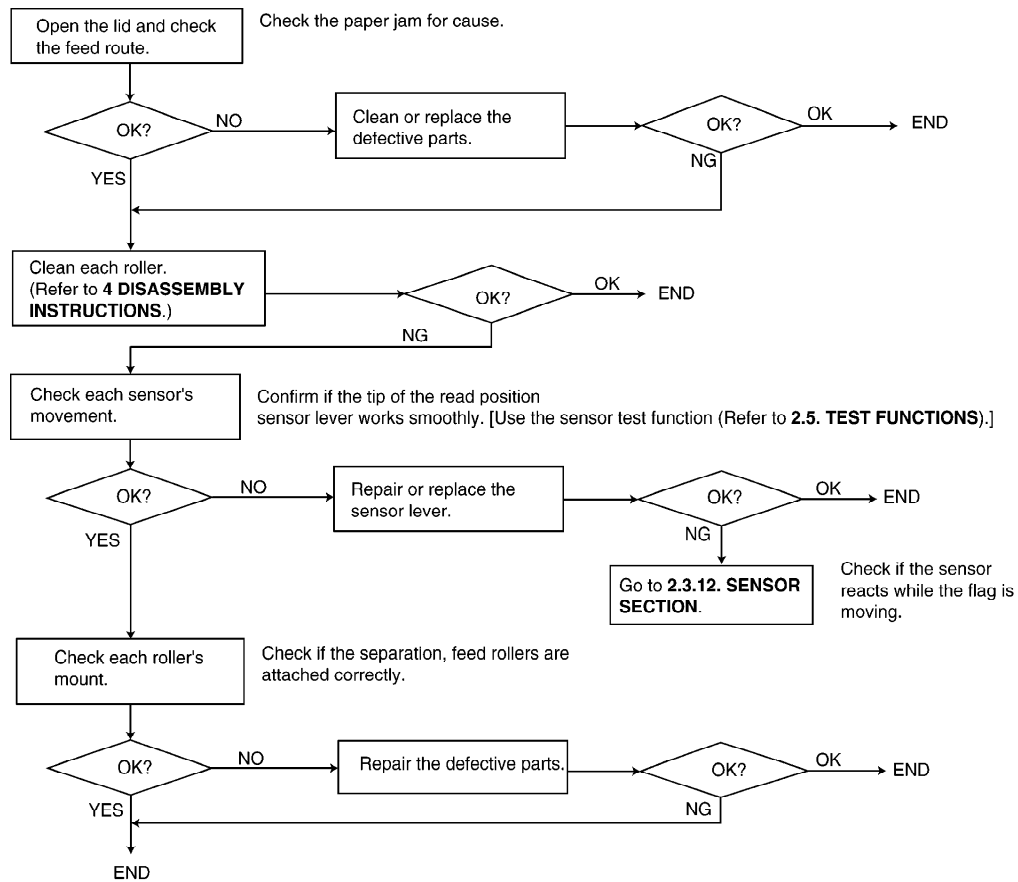
STEPPING MOTOR DRIVE CIRCUIT()

Note:

When using thin paper etc., sometimes the document will not feed.

Refer to **ADJUSTING THE FEEDER PRESSURE()**.

2.3.4.2. DOCUMENT JAM



CROSS REFERENCE:

[SENSOR SECTION\(\)](#)

[TEST FUNCTIONS\(\)](#)

[DISASSEMBLY INSTRUCTIONS\(\)](#)

2.3.4.3. MULTIPLE FEED

- When using thick paper etc., sometimes the document will not be fed.

Refer to [ADJUSTING THE FEEDER PRESSURE\(\)](#).

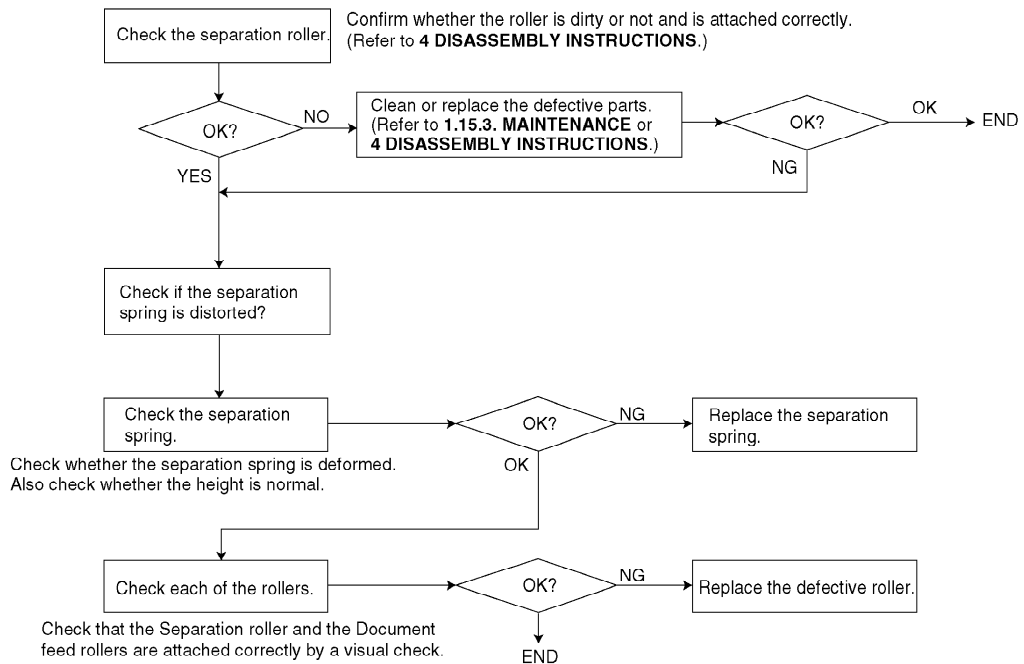
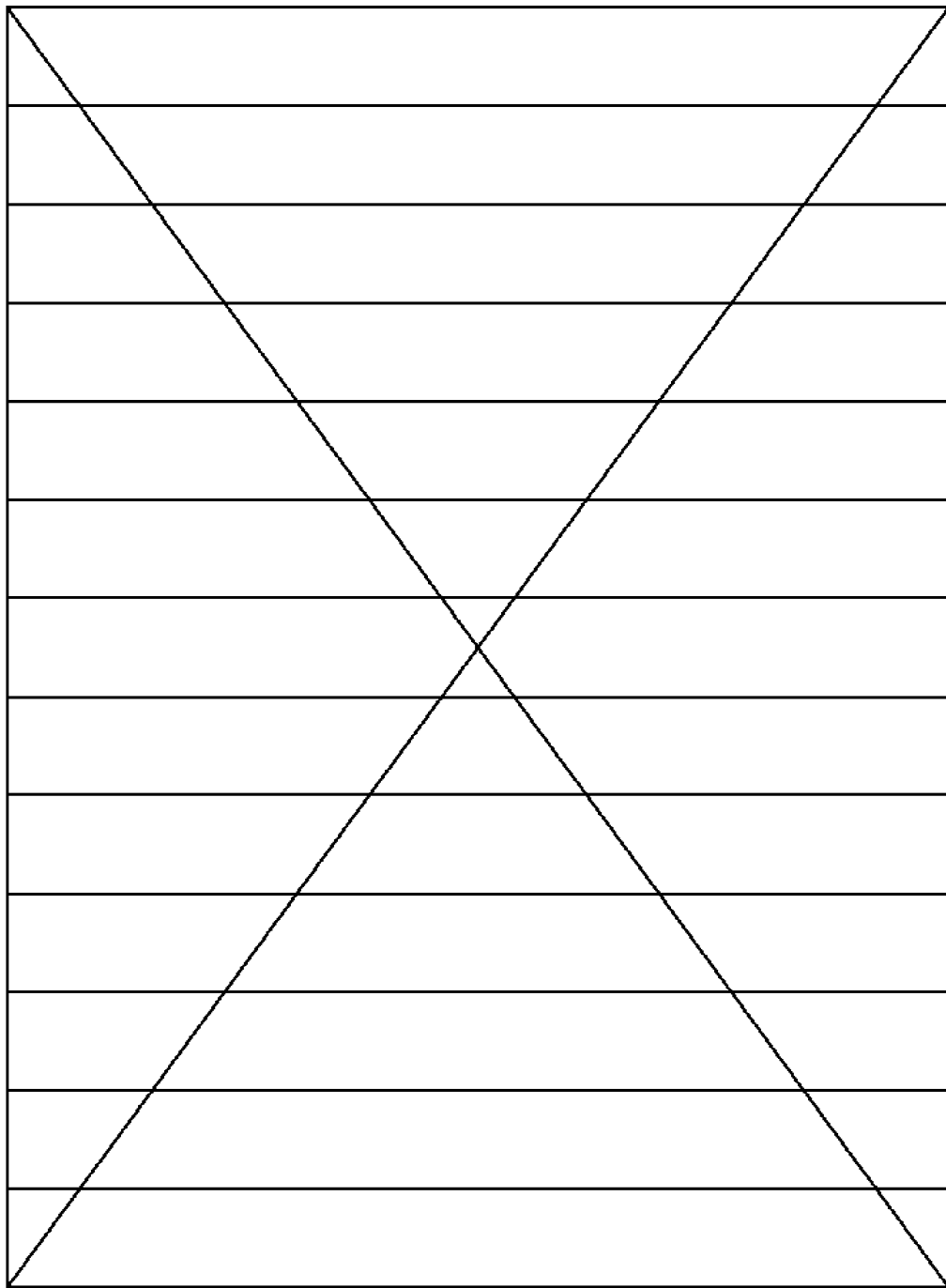


Fig. B



CROSS REFERENCE:

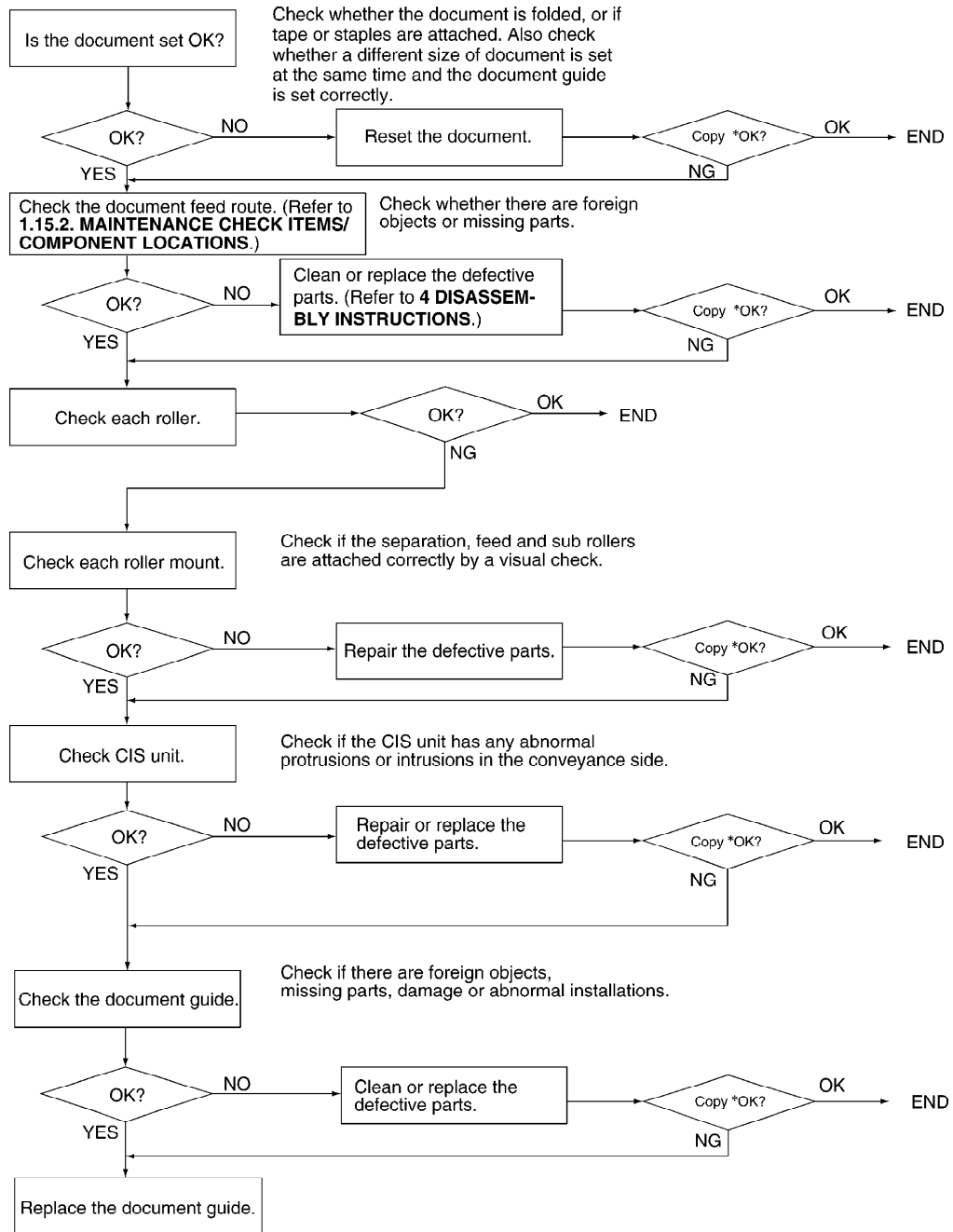
MAINTENANCE()

DISASSEMBLY INSTRUCTIONS()

Note:

When confirming if the characters are extended or distorted, or if the feed problem is occurred, use this test chart format (Fig. B).

2.3.4.4. SKEW



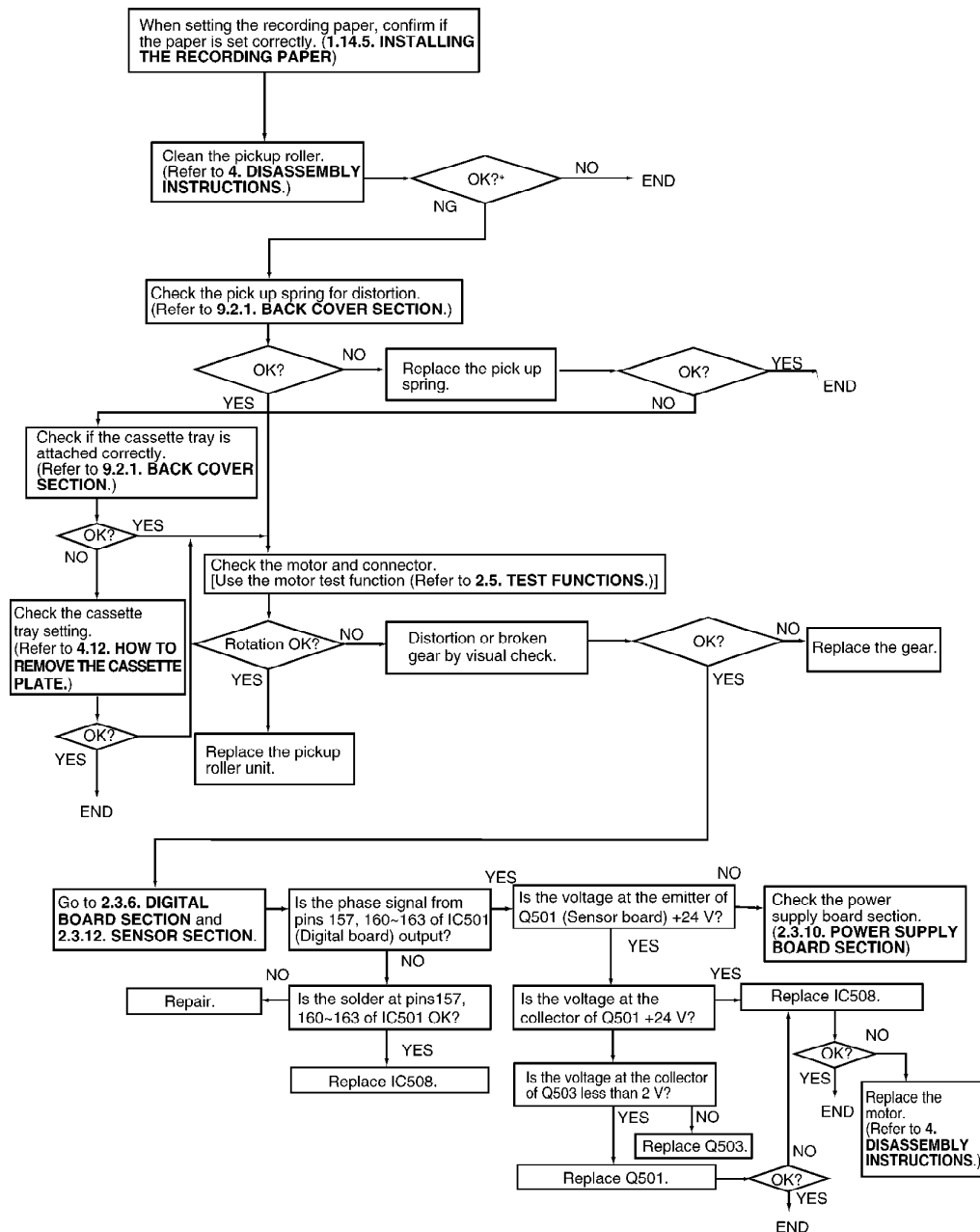
* We recommend making a copy of the Fig. B document in **MULTIPLE FEED ()** and using it.

CROSS REFERENCE:

MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS()

DISASSEMBLY INSTRUCTIONS()

2.3.4.5. THE RECORDING PAPER DOES NOT FEED



* We recommend making a copy of the Fig. B document in **MULTIPLE FEED** ()and using it.

CROSS REFERENCE:

INSTALLING THE RECORDING PAPER()

DIGITAL BOARD SECTION()

POWER SUPPLY BOARD SECTION()

SENSOR SECTION()

TEST FUNCTIONS()

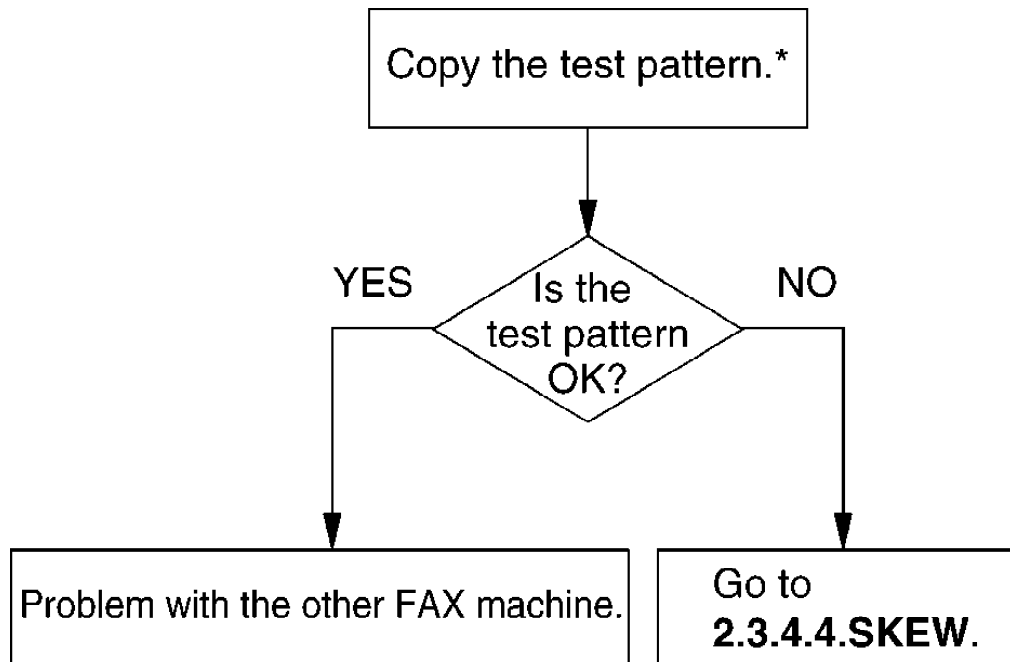
DISASSEMBLY INSTRUCTIONS()

HOW TO REMOVE THE CASSETTE TRAY()

BACK COVER SECTION()

2.3.4.6. PAPER JAM

2.3.4.8. THE SENT FAX DATA IS SKEWED

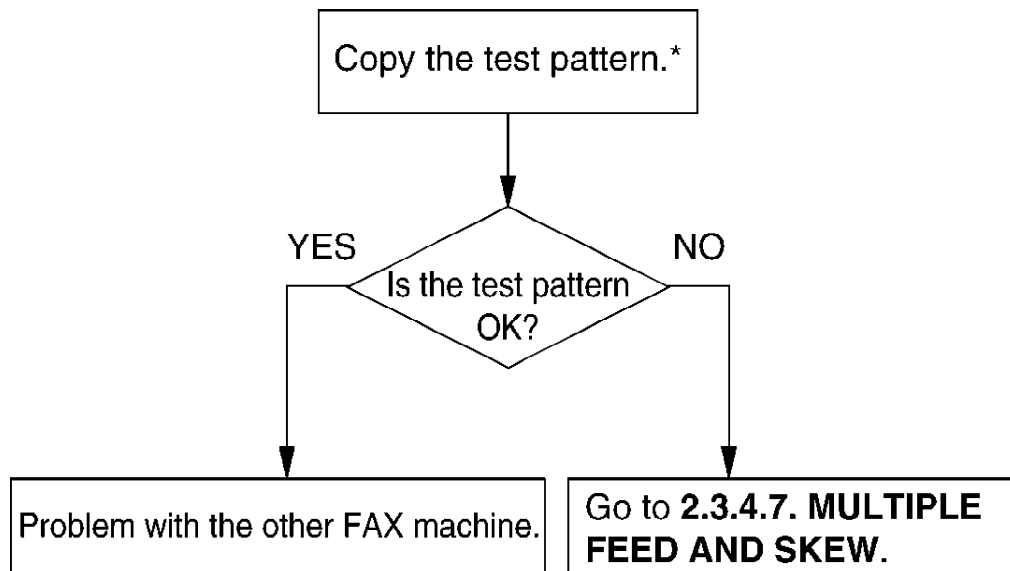


* We recommend making a copy of the Fig. B document in **MULTIPLE FEED()** and using it.

CROSS REFERENCE:

SKEW()

2.3.4.9. THE RECEIVED FAX DATA IS SKEWED

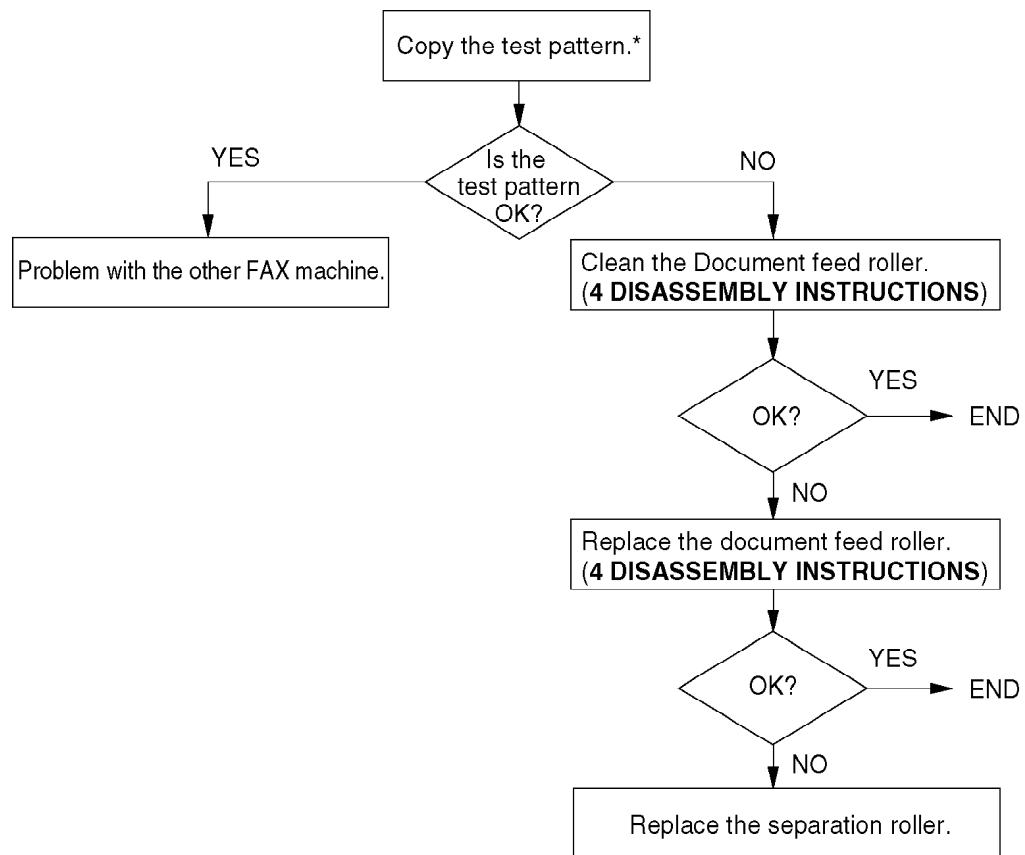


* We recommend making a copy of the Fig. B document in **MULTIPLE FEED()** and using it.

CROSS REFERENCE:

MULTIPLE FEED AND SKEW()

2.3.4.10. RECEIVED OR COPIED DATA IS EXPANDED

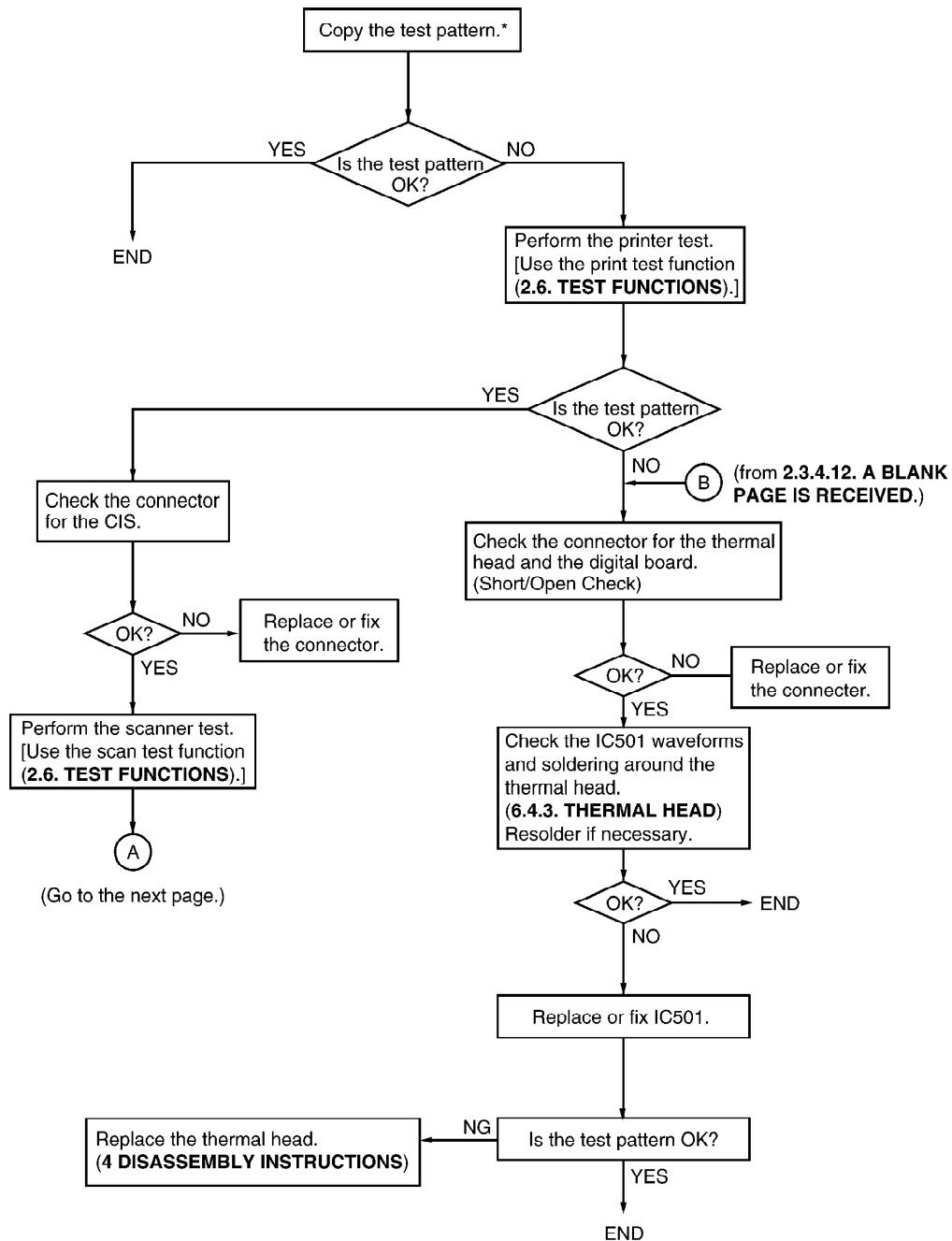


* We recommend making a copy of the Fig. B document in **MULTIPLE FEED()** and using it.

CROSS REFERENCE:

DISASSEMBLY INSTRUCTIONS()

2.3.4.11. A BLANK PAGE IS COPIED



* We recommend making a copy of the Fig. B document in **MULTIPLE FEED ()** and using it.

CROSS REFERENCE:

A BLANK PAGE IS RECEIVED()

TEST FUNCTIONS()

DISASSEMBLY INSTRUCTIONS()

THERMAL HEAD()

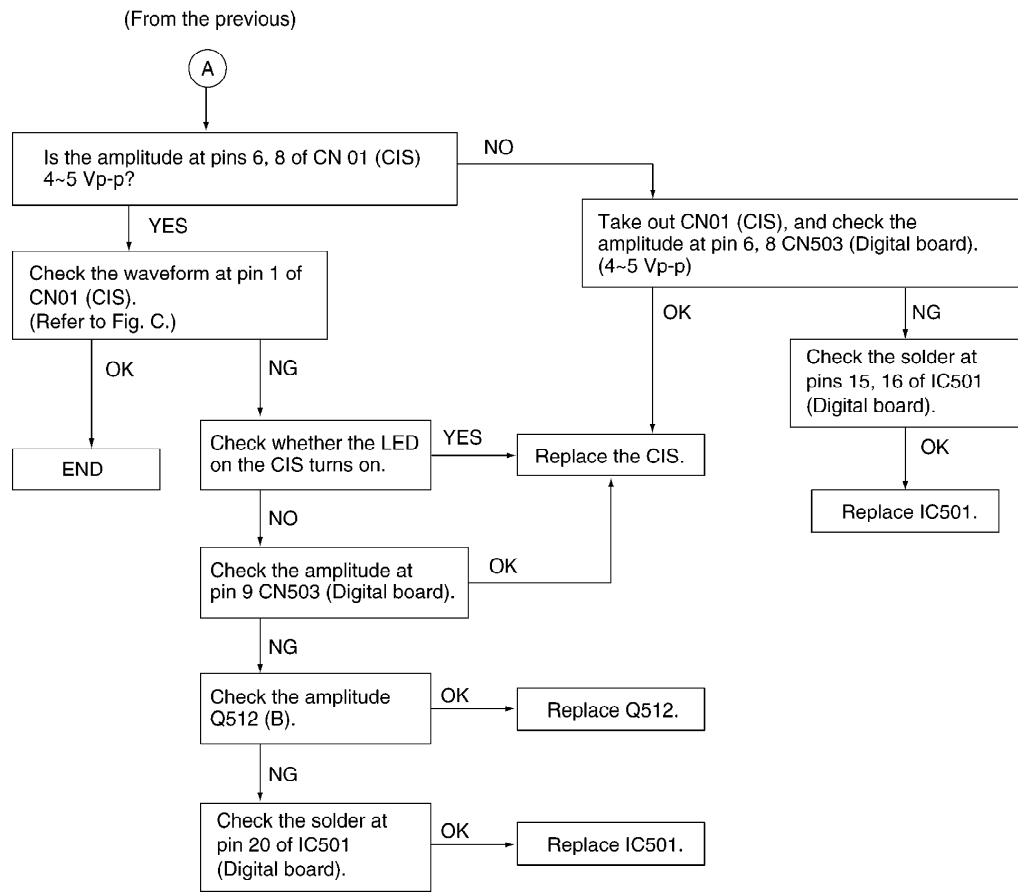
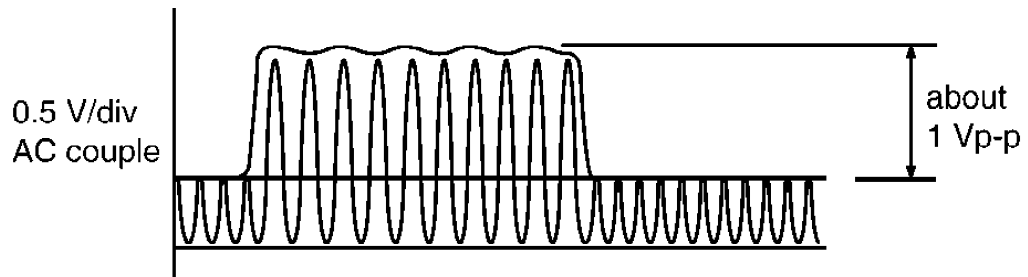
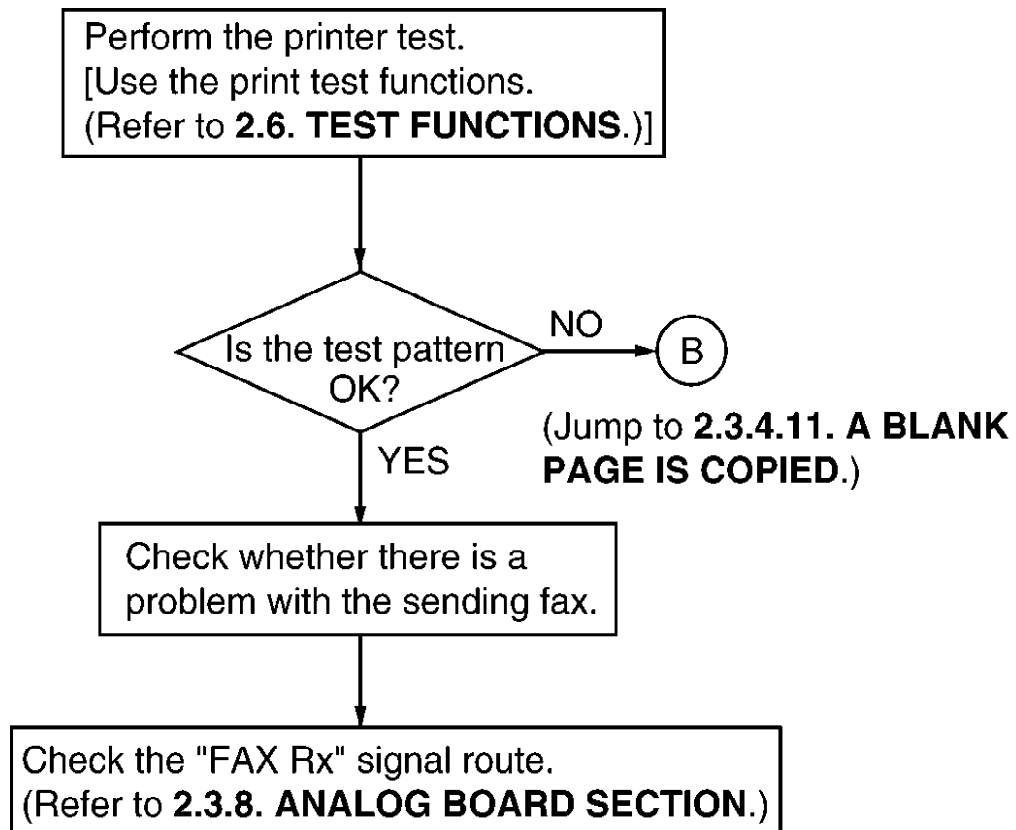


Fig. C



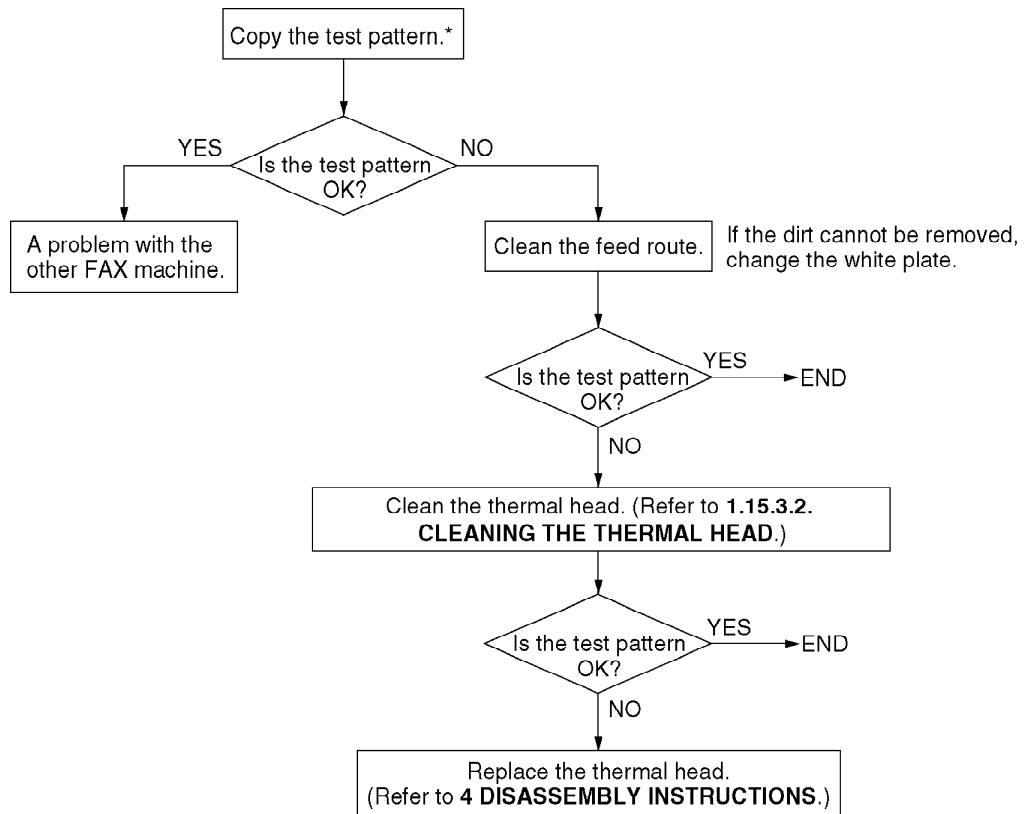
2.3.4.12. A BLANK PAGE IS RECEIVED



CROSS REFERENCE:

A BLANK PAGE IS COPIED()
ANALOG BOARD SECTION()
TEST FUNCTIONS()

2.3.4.13. BLACK OR WHITE VERTICAL LINE

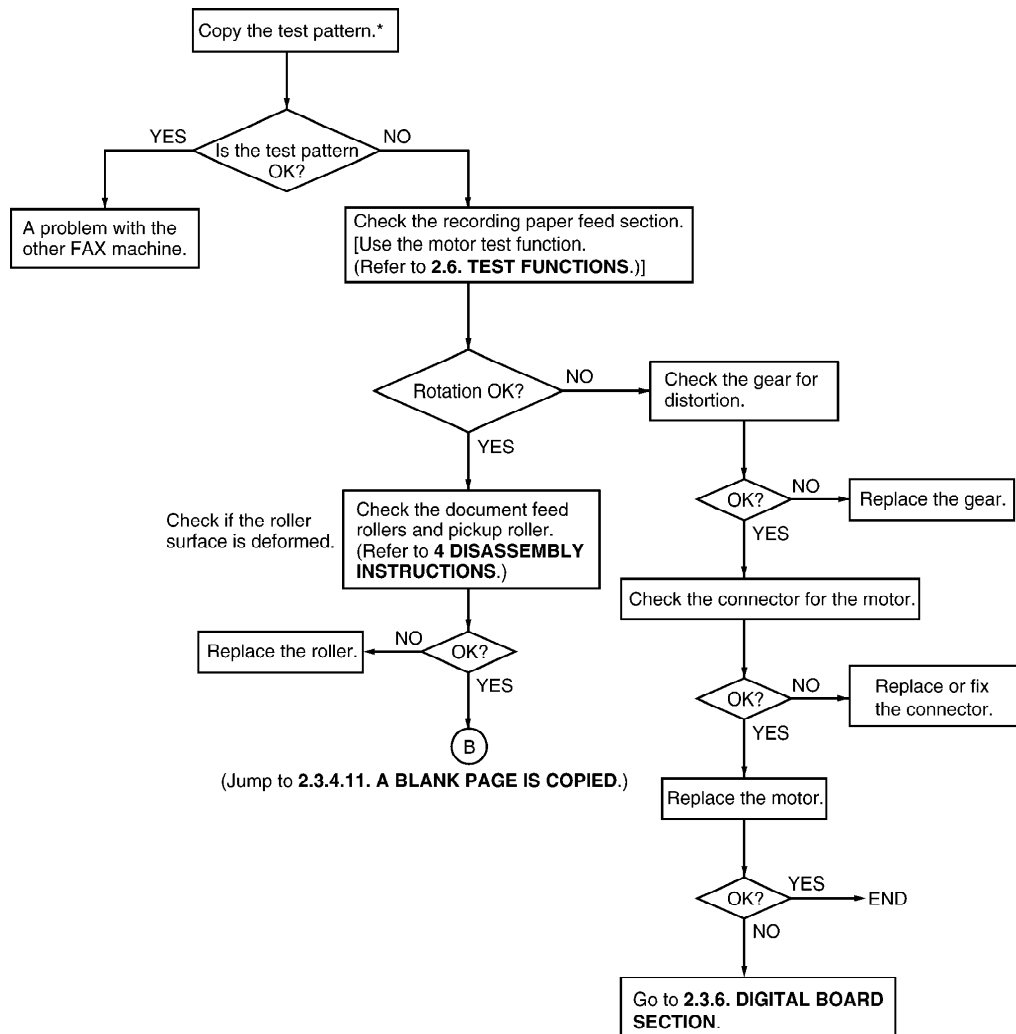


* We recommend making a copy of the Fig. B document in **MULTIPLE FEED ()** and using it.

CROSS REFERENCE:

CLEANING THE THERMAL HEAD AND BLACK BAR()
DISASSEMBLY INSTRUCTIONS()

2.3.4.14. BLACK OR WHITE LATERAL LINE ON PRINT OUT



* We recommend making a copy of the Fig. B document in **MULTIPLE FEED()** and using it.

CROSS REFERENCE:

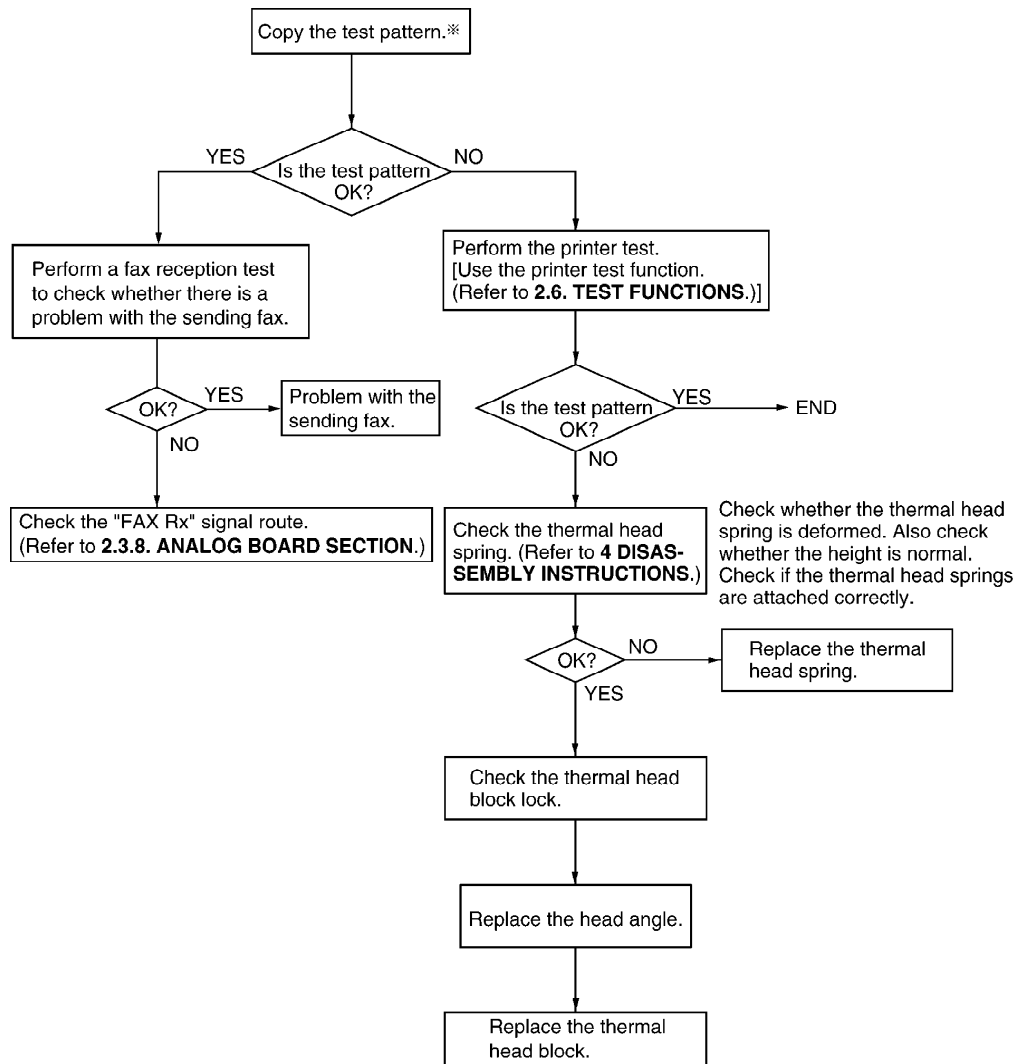
A BLANK PAGE IS COPIED()

DIGITAL BOARD SECTION()

TEST FUNCTIONS()

DISASSEMBLY INSTRUCTIONS()

2.3.4.15. AN ABNORMAL IMAGE IS PRINTED



* We recommend making a copy of the Fig. B document in **MULTIPLE FEED ()** and using it.

CROSS REFERENCE:

ANALOG BOARD SECTION()

TEST FUNCTIONS()

DISASSEMBLY INSTRUCTIONS()

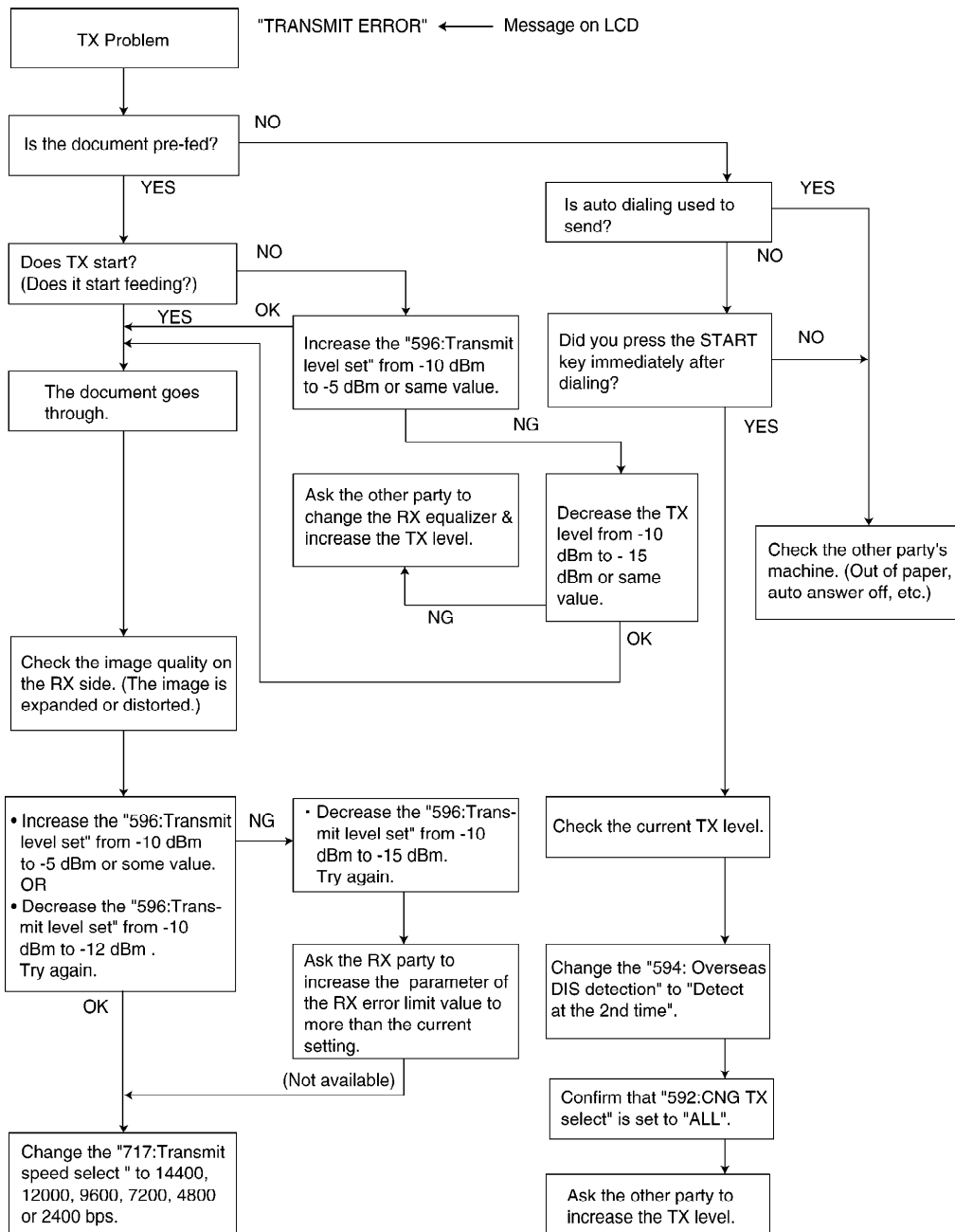
2.3.5. COMMUNICATION SECTION

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in **DEFECTIVE FACSIMILE SECTION** .

No.	Symptom	Content	Possible cause
1	The paper is not fed properly when faxing. (Nor in the copy mode.)	Troubleshooting	Problem with the feeding mechanism.
2	The fax usually transmits successfully but sometimes fails. (The unit can copy documents.)	Troubleshooting	Problem with the service line or with the receiver's fax.
3	The fax usually receives successfully but sometimes fails. (The unit can copy documents.)	Troubleshooting	Problem with the service line or with the transmitter's fax.
4	The fax completely fails to transmit or receive. (The unit can copy documents.)	Troubleshooting	Problem with the electric circuit.
5	The fax fails either to transmit or receive when making a long distance or an international call. (The unit can copy documents.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line.
6	The fax image is poor when transmitting or receiving during a long distance or an international call.		
7	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	

2.3.5.1. DEFECTIVE FACSIMILE SECTION

2.3.5.1.1. TRANSMIT PROBLEM

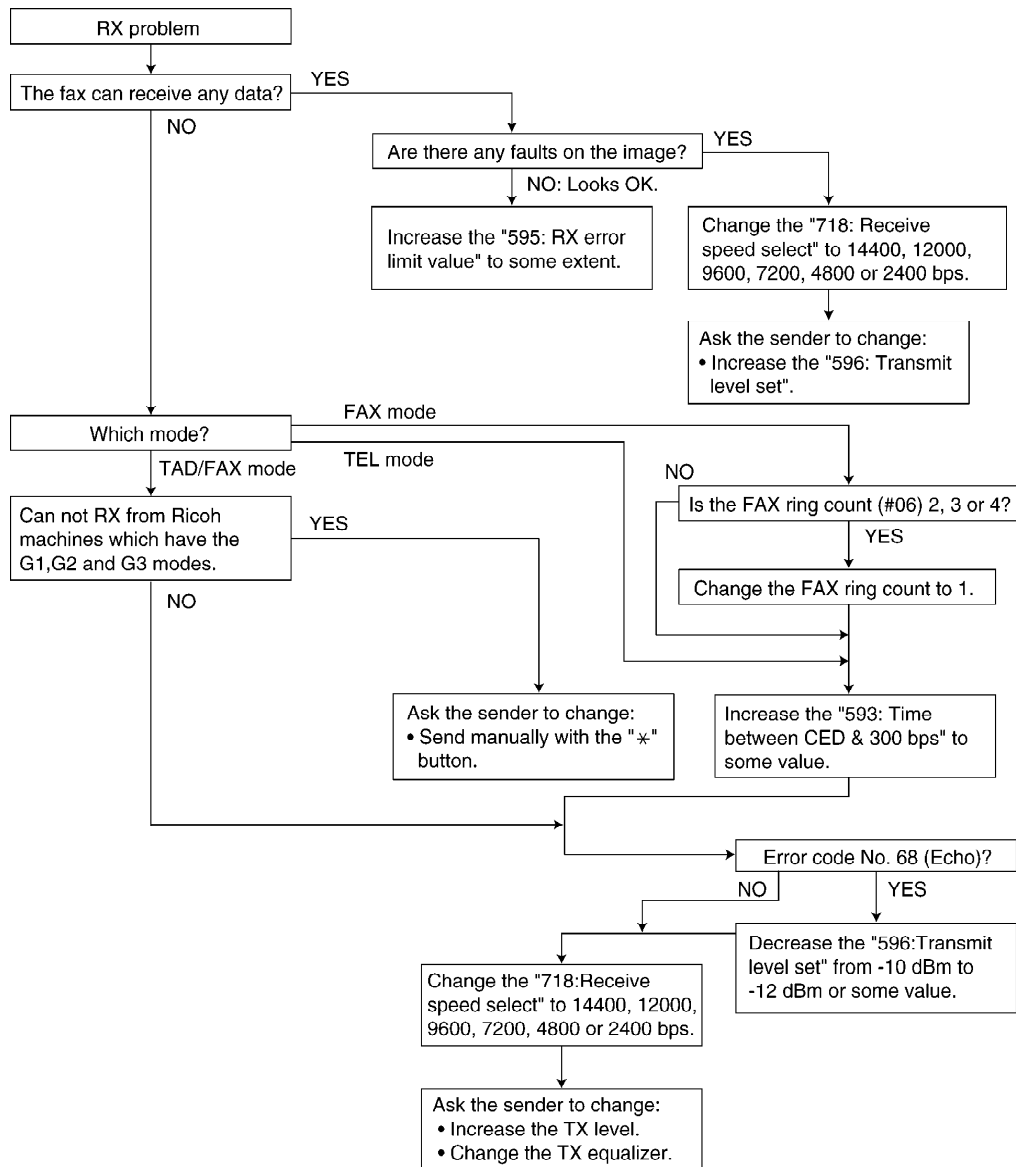


Note:

"596: Transmit level set" represents a service code. (Refer to **SERVICE FUNCTION TABLE()**.)

2.3.5.1.3. RECEIVE PROBLEM

First confirm whether the recording paper is installed properly or not before starting troubleshooting. (Refer to "Remarks".)



Note:

"596: Transmit level set" represents a service code. (Refer to **SERVICE FUNCTION TABLE()**.)

Remarks:

Regarding the reception problem, we have investigated the conceivable causes in the flow chart except for the software-related errors. However, some troubles may occur due to the software-related problems such as "OUT OF PAPER" when the fax switches to the memory receiving mode and the memory capacity becomes full of the unprintable data. In this case, error messages [MEMORY FULL] and its main cause, for example "CHECK PAPER" are displayed on the LCD. Once you solve the main problem, [MEMORY FULL] will be cancelled and the reception problem will be resolved.

LCD display messages indicating the error causes are shown below.

CHECK PAPER

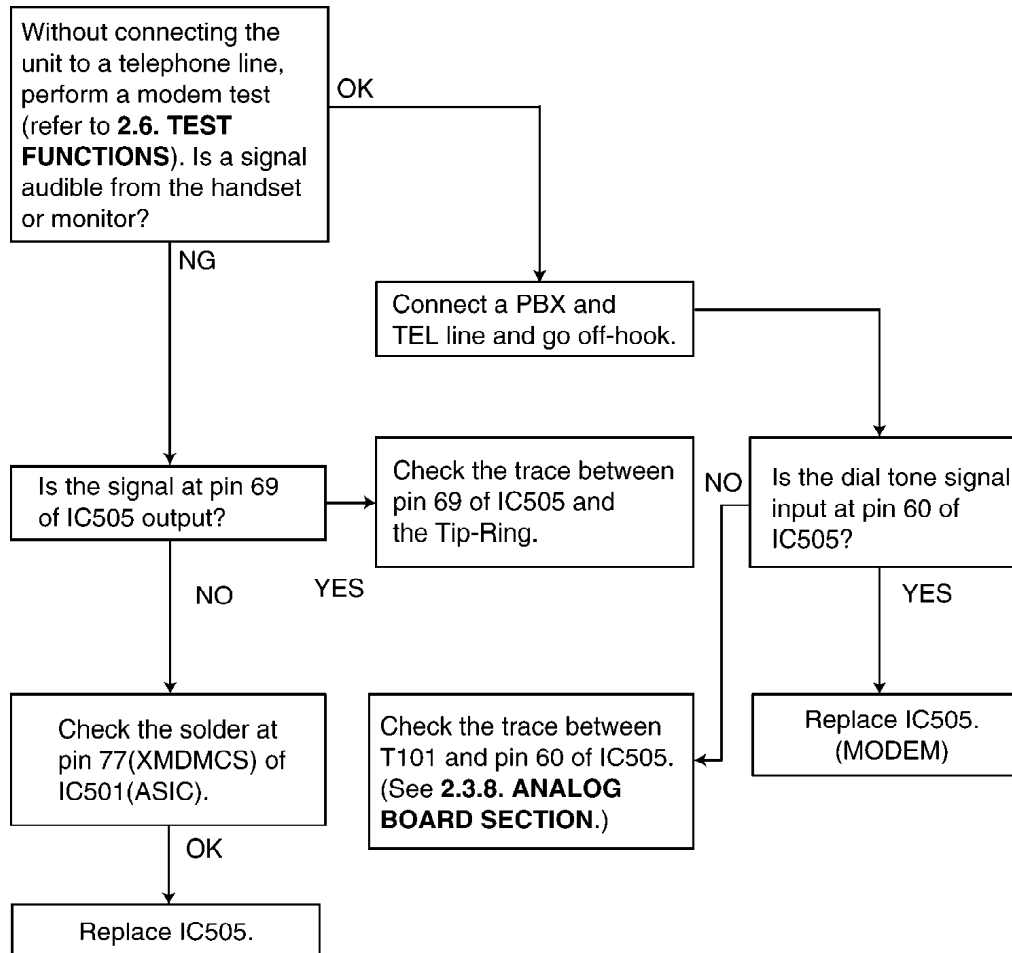
COVER OPEN

UNIT OVERHEATED (COVER OPEN, etc.)...Reset the unit.

**PAPER JAMMED
CHECK FILM**

Please refer to **USER RECOVERABLE ERRORS ()** for the above items. If it turns out to be a hardware deformity, please check each sensor. (Refer to **TEST FUNCTIONS ()**.)

2.3.5.1.4. THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE



CROSS REFERENCE:
ANALOG BOARD SECTION()
TEST FUNCTIONS()

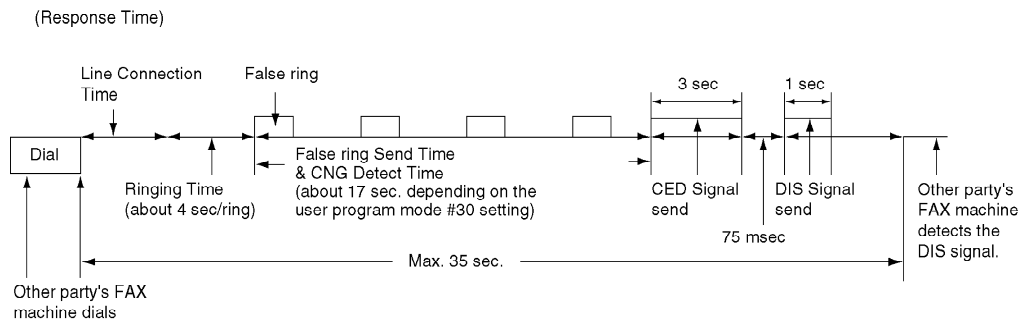
2.3.5.1.5. THE UNIT CAN COPY, BUT CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS

The following two causes can be considered for this symptom.

Cause 1:

The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to CED or DIS.) (According to the ITU-T standard, the communication

procedure is cancelled when there is no response from the other party within 35 sec, so that the other party releases the line.)



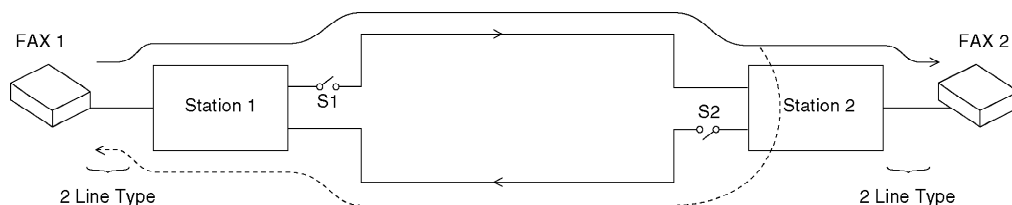
(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried.

(A)... As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection because of an echo or an echo canceler.



(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service
1	Sending side	Some time is needed to compare the level of the receiving and sending signals for the echo canceler. The header of the training signal lacks due to a switching delay to close S1.	Add a dummy signal to the beginning of the training signal.	Service code (International selection) This countermeasure becomes the value
2	Receiving side	The echo canceler function stops according to a CED signal frequency of 2100Hz (S1 and S2 are both ON), a DIS signal is returned as an echo, and a DCS signal from the sending side overlaps the DIS echo. Then the receiving side FAX cannot retrieve the DCS signal. (Refer to Fig. a)	Change to a 1100Hz CED signal frequency. (Refer to Fig. b)	Service code (CED frequency selection)
	Receiving side		Change the regular time of 75 msec between the CED signal and DIS signal to 500 msec. This will give at least 250 msec to recover the echo canceler operation. (Refer to Fig. c)	Service code (Time between CED and DIS)
	Sending side		The sending side FAX sends a DCS signal not after receiving the 1st DIS signal but after receiving the 2nd DIS signal. (Refer to Fig. d)	Service code (Overseas detection)
3	Sending side	Communication failure occurs in a long distance communication on the telephone line without an echo canceler.	Decrease the transmission level from -10 dBm to -15 dBm and the echo level will decrease.	Service code (Transmit level)
4	Sending side Receiving side	or	Decrease the receiving sensitivity from -13 dBm to about -32 dBm so an echo signal will not be received.	Service code (Receiving sensitivity)
5	Sending side Receiving side	There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal. (Refer to Fig. e)	Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both ends.	Service code (T4 time)

Fig. a (Overlapping the Echo of the DIS signal and DCS signal)

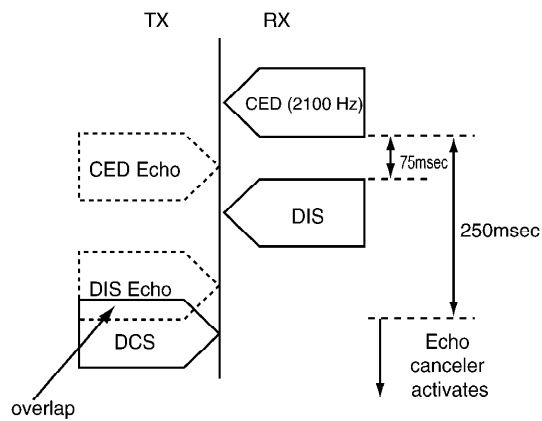


Fig. b (Countermeasure by Changing the CED Frequency)

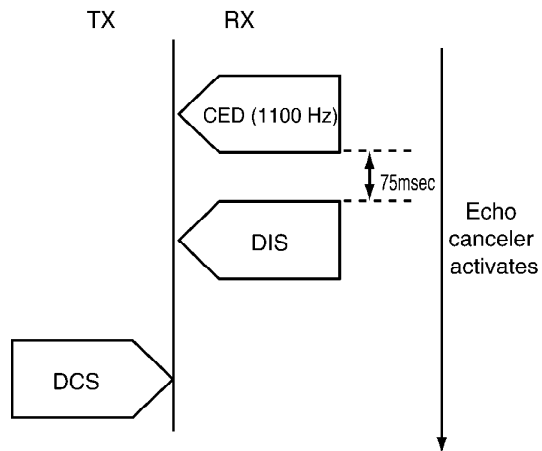


Fig. c (Countermeasure by Changing the Interval Between CED and DIS)

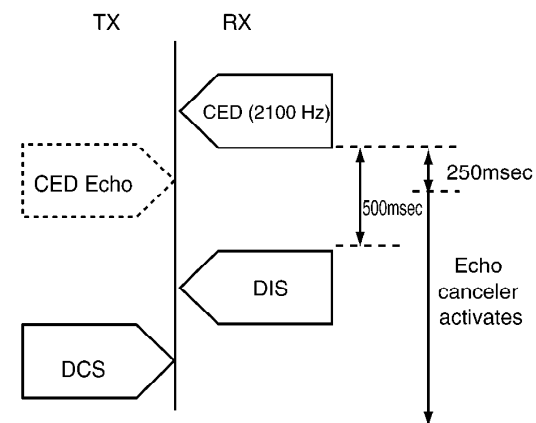
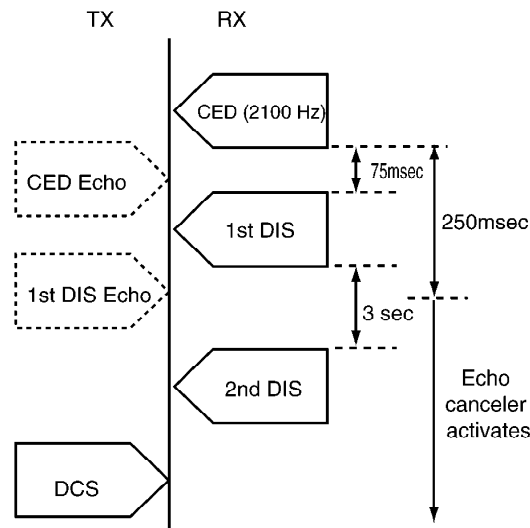
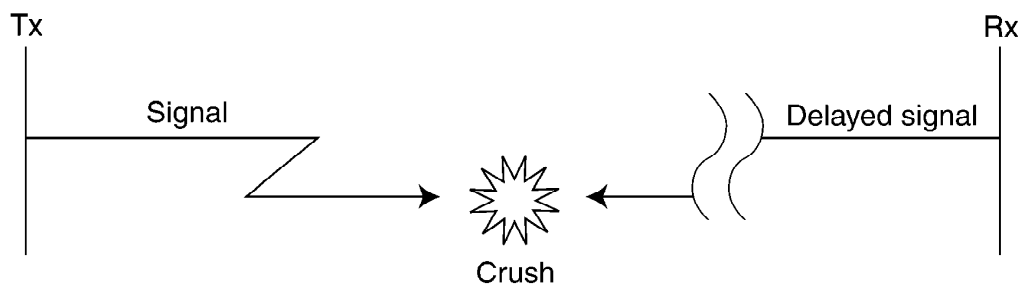


Fig. d (Countermeasure by Ignoring the 1st DIS)



<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side

(Fig. e)



2.3.5.1.6. THE UNIT CAN COPY, BUT THE TRANSMISSION AND RECEPTION IMAGE ARE INCORRECT

(Long distance or international communication operation)

This symptom highly depends on the transmission and reception capability of the other FAX unit and the line conditions.

The countermeasures for this unit are shown below.

Transmission Operation:

Set the transmitting speed to 4800BPS (service mode: code No. 717) or select the overseas mode.

Reception Operation:

If 80% or more of the reception is incorrect, set the receiving speed to 4800BPS. (Service mode: code No. 718)

- Refer to **SERVICE FUNCTION TABLE()**.

2.3.5.1.7. HOW TO OUTPUT THE JOURNAL REPORT

1. Press the MENU button two times.
2. Rotate EASY DIAL until the “ JOURNAL REPORT ” is displayed.
3. Press the SET button.
4. The report prints out.

JOURNAL							
Jan. 20 2001 01:19PM							
YOUR LOGO :							
YOUR FAX NO:							
NO.	OTHER FACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT	*CODE
01	2345678	Jan. 20 01:18PM	00'51	SND	00	COMMUNICATION ERROR	(43)

(3) SND: Sent directly.
RCV: Received directly

(2) Communication message

(1) Error code

Error code table:

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Co me:
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	THE COVER WAS OPENED	SND & RCV	The cover is open.	
40	NO RESPONSE	SND	Transmission is finished when the T1 TIMER expires.	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BPS training signal.	
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	
46	COMMUNICATION ERROR	RCV	No response after FTT is transmitted.	
48	COMMUNICATION ERROR	RCV	No post message.	
49	COMMUNICATION ERROR	RCV	RTN is transmitted.	
50	COMMUNICATION ERROR	RCV	PIN is transmitted (to PRI-Q).	

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Co me:
51	COMMUNICATION ERROR	RCV	PIN is transmitted.	
52	NO RESPONSE	RCV	Reception is finished when the T1 TIMER expires.	
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after DIS transmission.	
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	
59	ERROR-NOT YOUR UNIT	SND	DCN responds to the post message.	
64	COMMUNICATION ERROR	SND	Polling is not possible.	
65	COMMUNICATION ERROR	SND	DCN is received before DIS reception.	
65	COMMUNICATION ERROR	RCV	Reception is not EOP, EOM PIP, PIN, RTP or RTN.	
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	
72	COMMUNICATION ERROR	RCV	Carrier is cut when the image signal is received.	
75	MEMORY FULL	RCV	The document was not received due to memory full.	
79	CANCELED	SND	The multi-station transmission was rejected by the user.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error. For the DCN, DCN, etc. abbreviations, refer to MODEM SECTION ().	

SND=TRANSMISSION RCV=RECEPTION

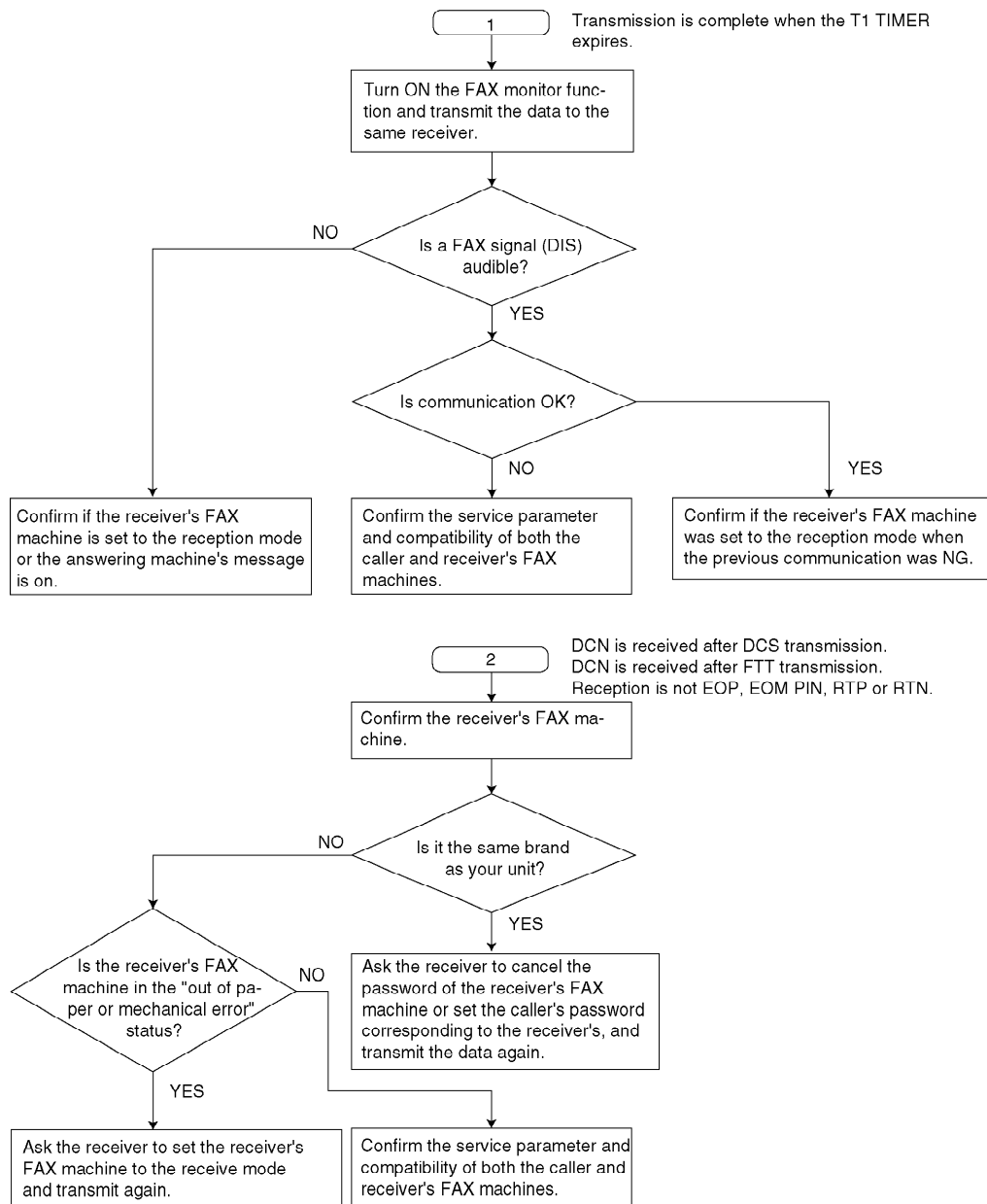
Most fax communication problems can be resolved by the following steps.

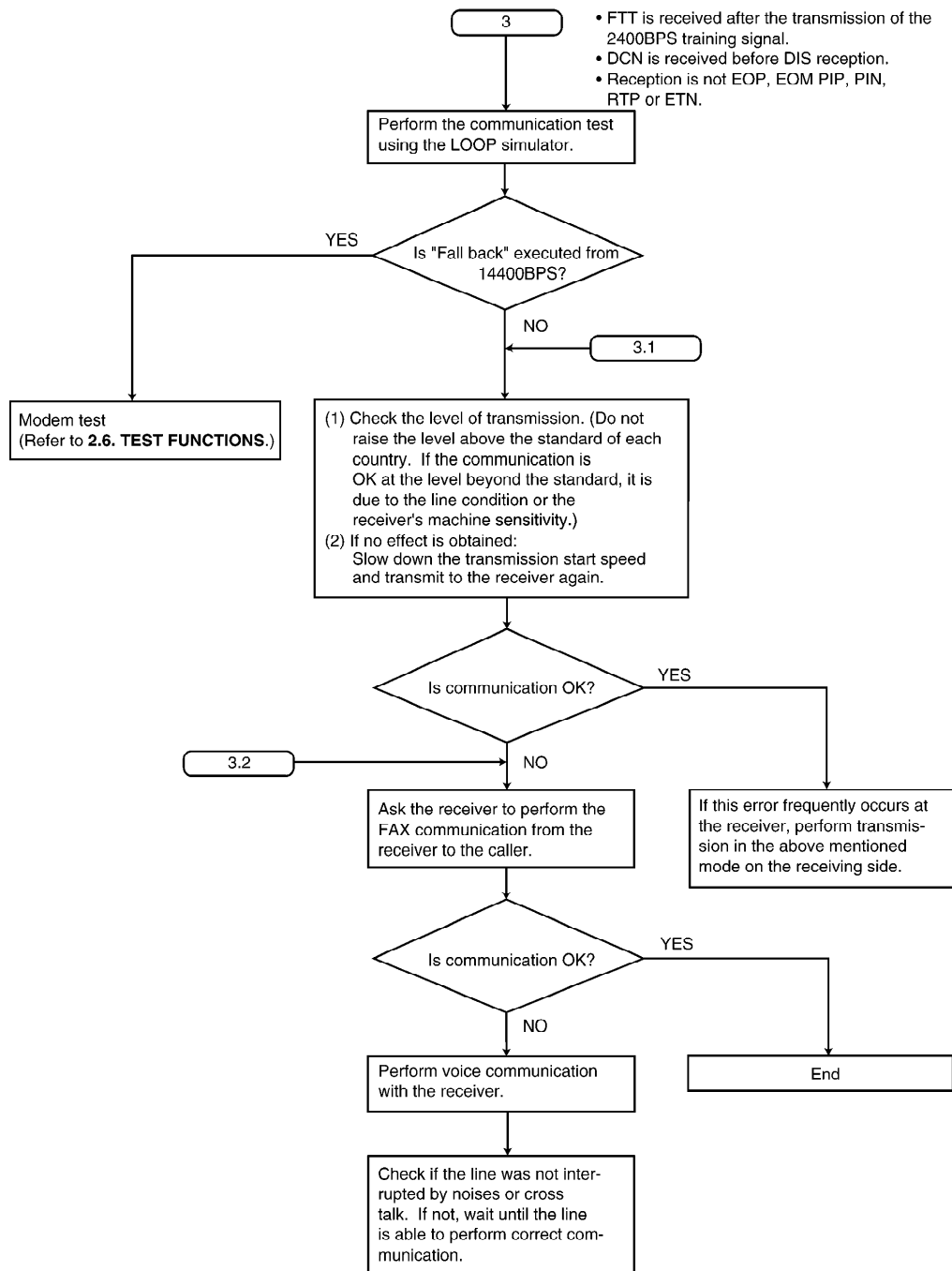
1. Change the transmit level. (Service code: 596, refer to **SERVICE FUNCTION TABLE** ().)
2. Change the TX speed/RX speed. (Service code: 717/718, refer to **SERVICE FUNCTION TABLE** ().)

Note*:

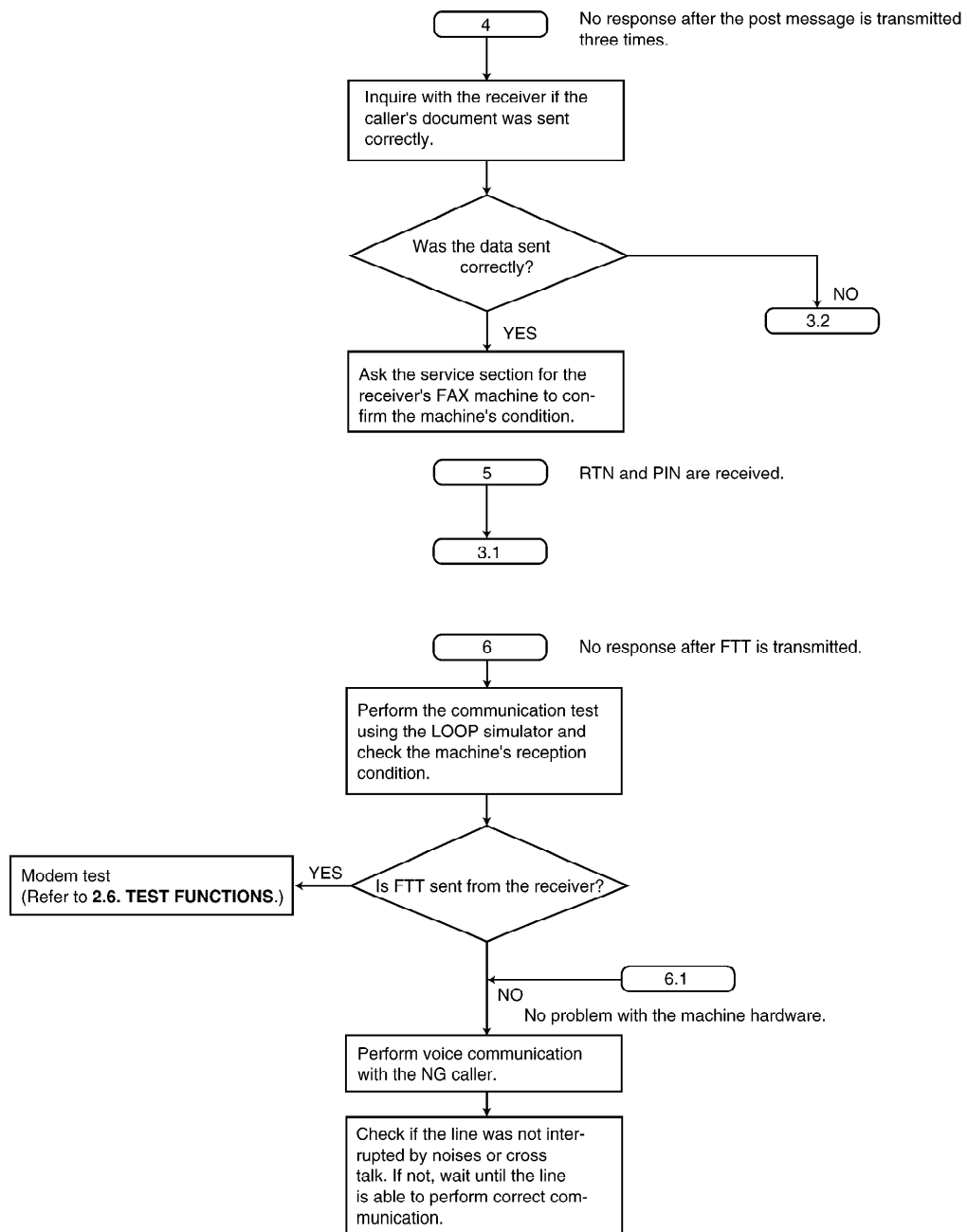
If the problem remains, see the following "Countermeasure" flow chart.

Countermeasure

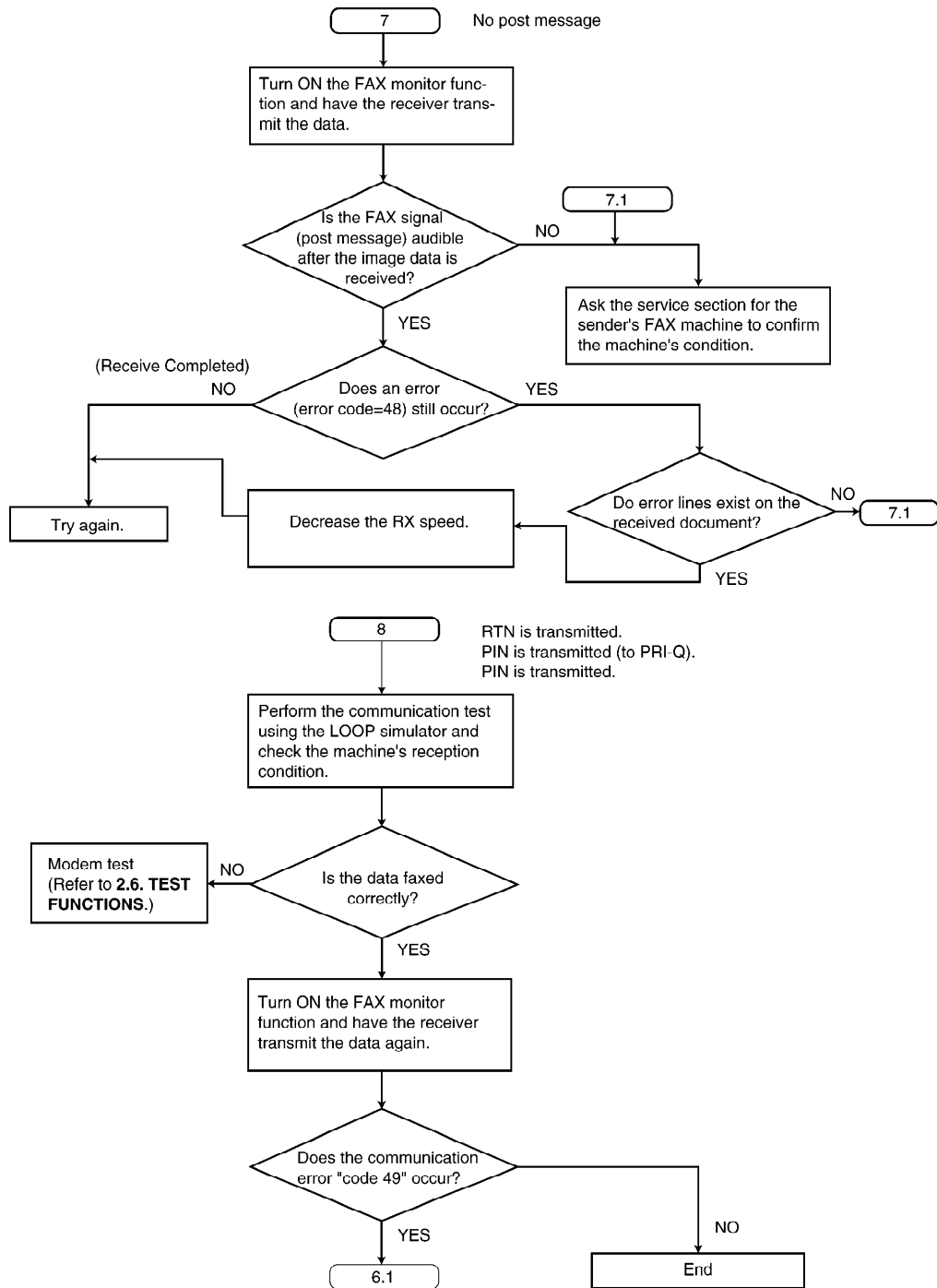




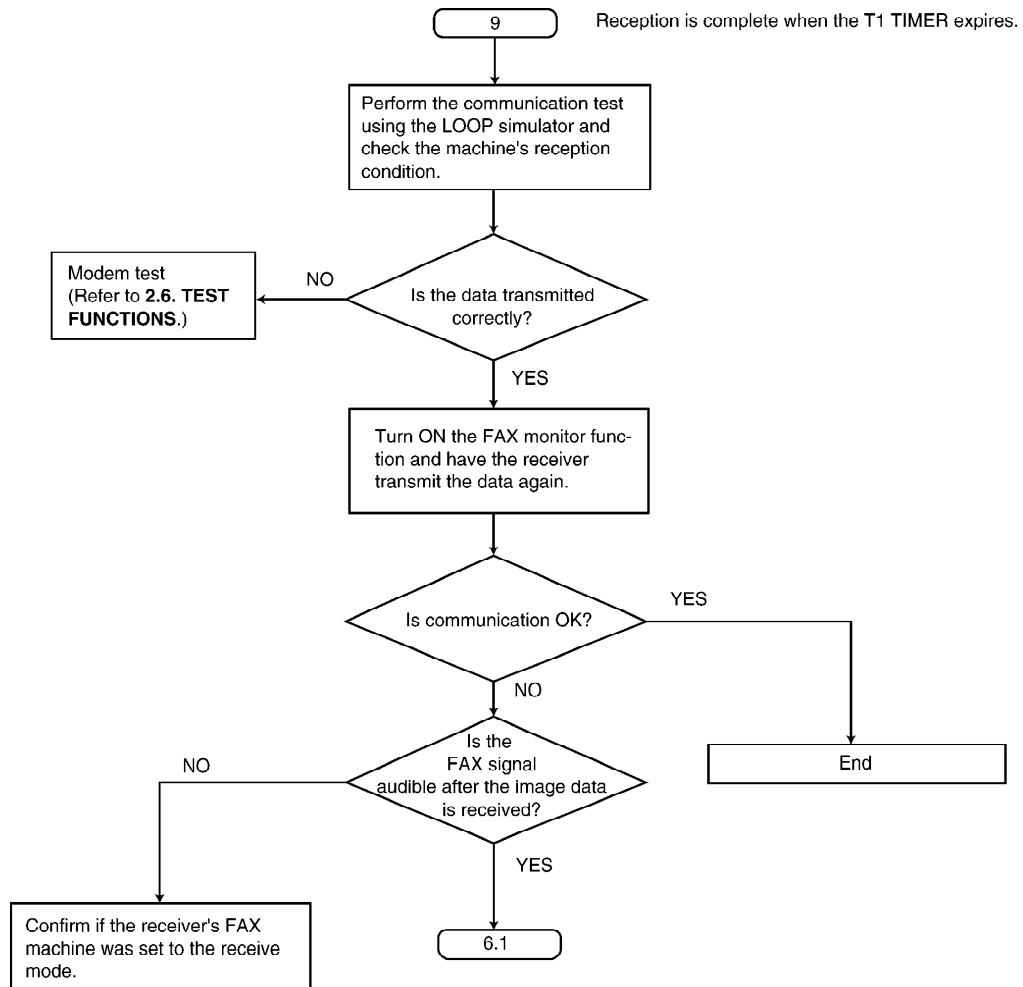
CROSS REFERENCE:
TEST FUNCTIONS()



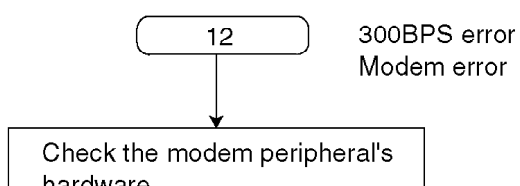
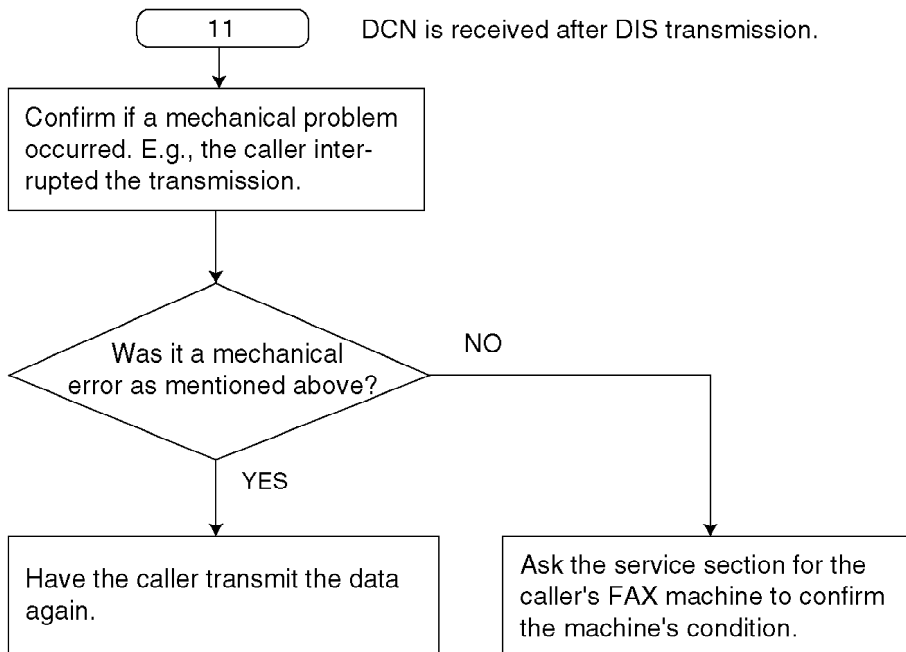
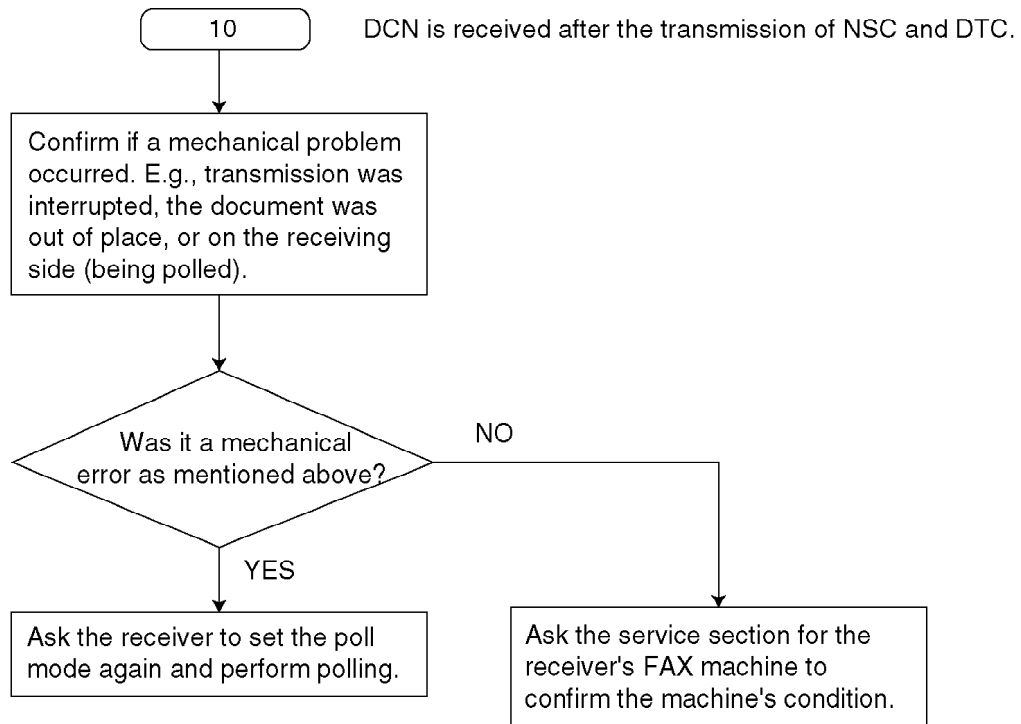
CROSS REFERENCE:
TEST FUNCTIONS()



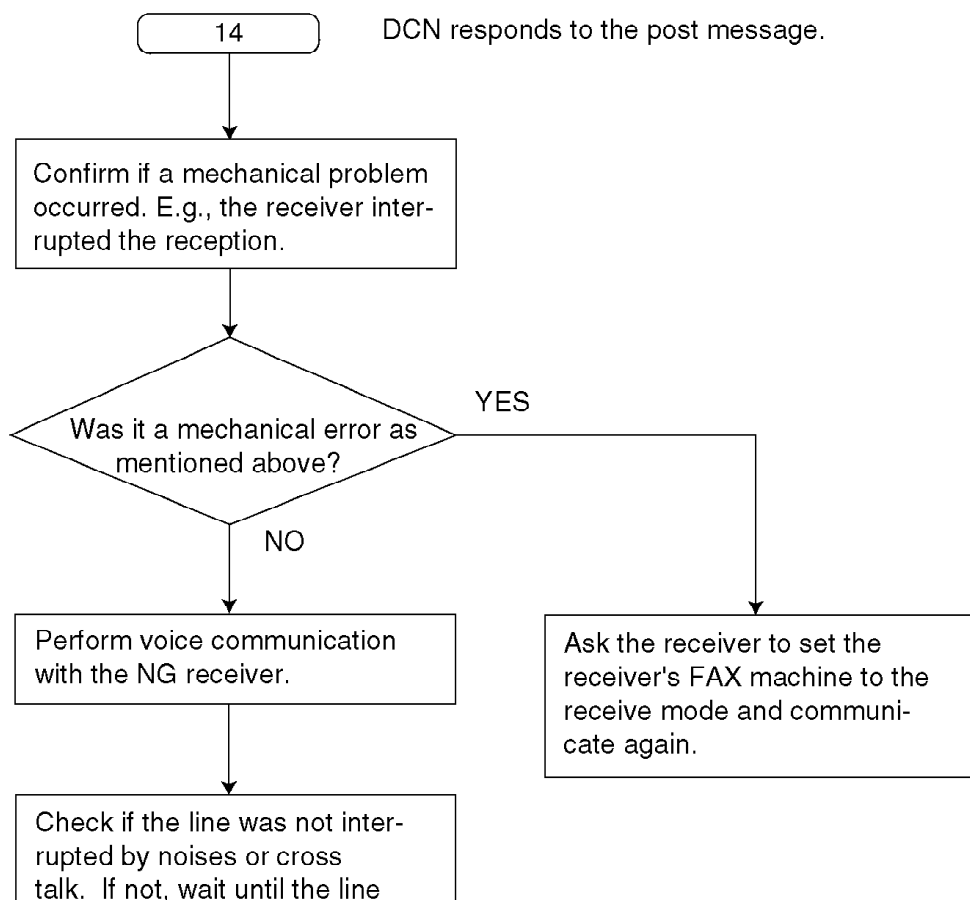
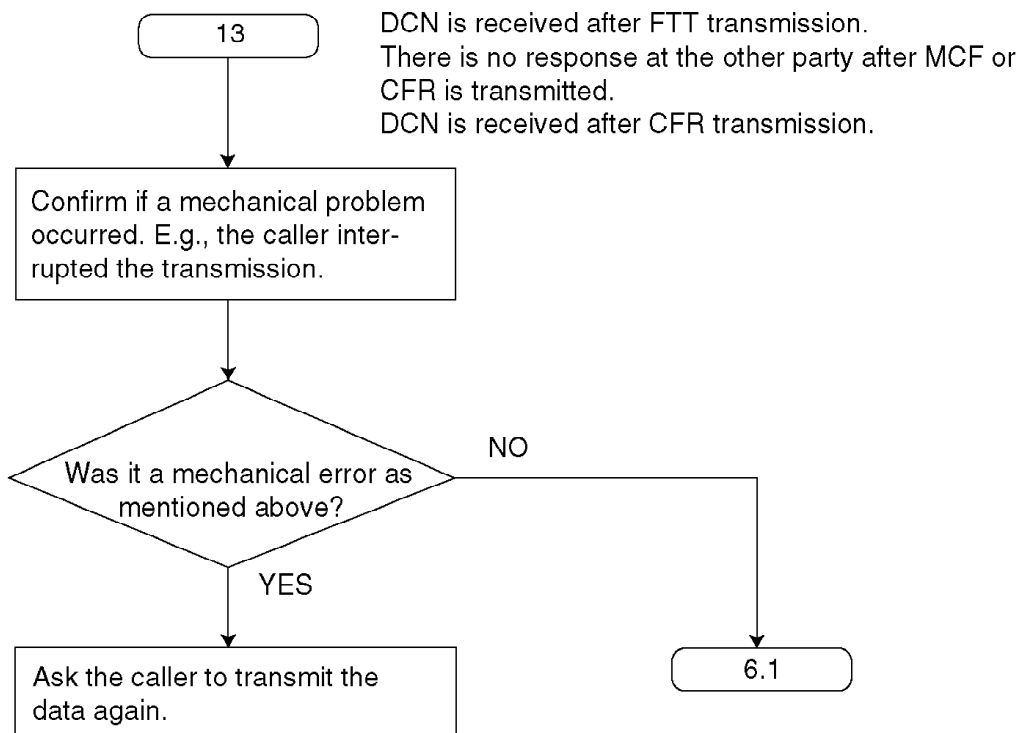
CROSS REFERENCE:
TEST FUNCTIONS()

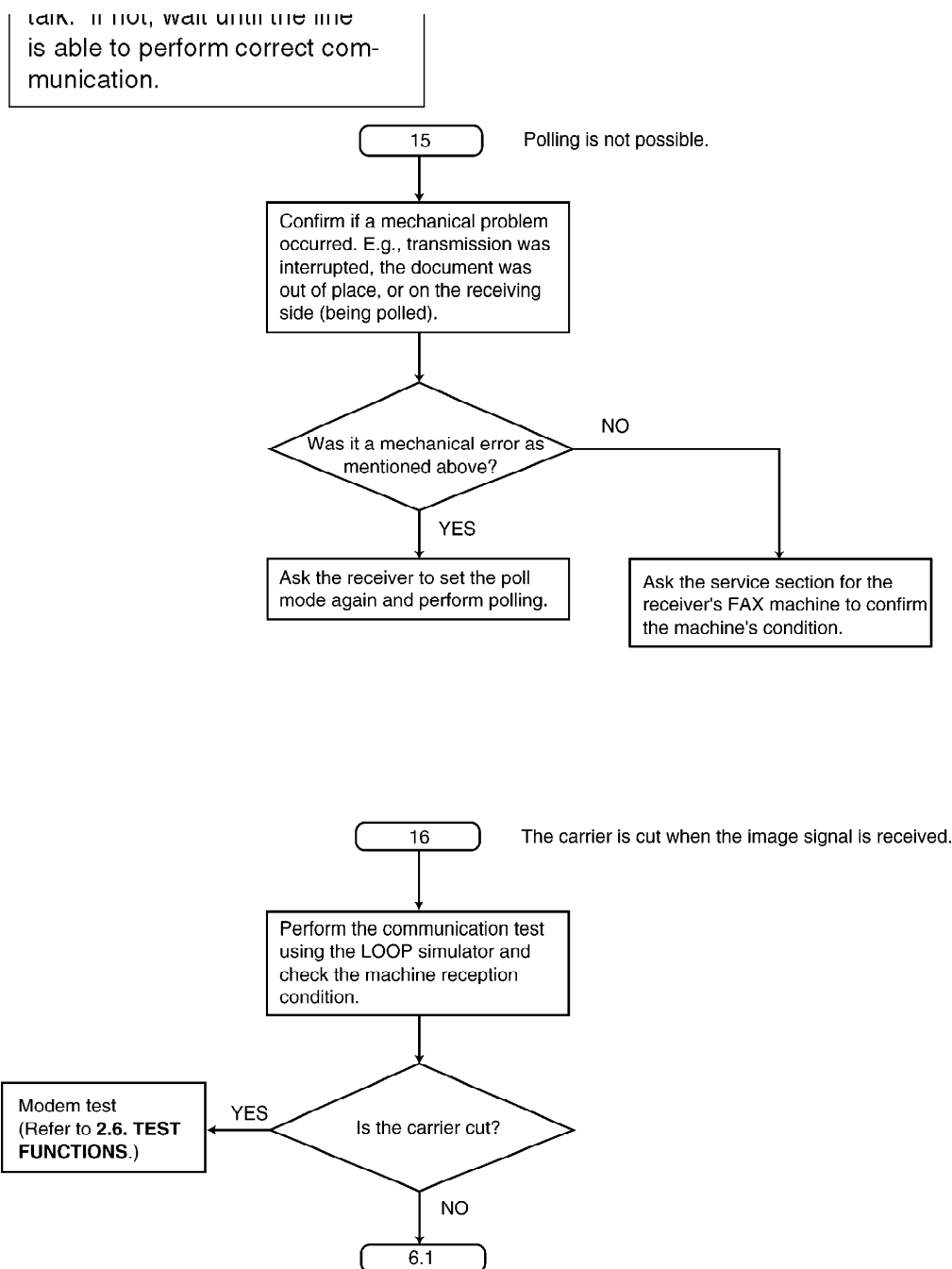


CROSS REFERENCE:
TEST FUNCTIONS()



hardware.





CROSS REFERENCE:
TEST FUNCTIONS()

2.3.5.2. REMOTE PROGRAMMING

If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (**PROGRAM MODE TABLE()**). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, print out the setup list (code: 991) and the service list (code: 999) from the customer's fax machine.

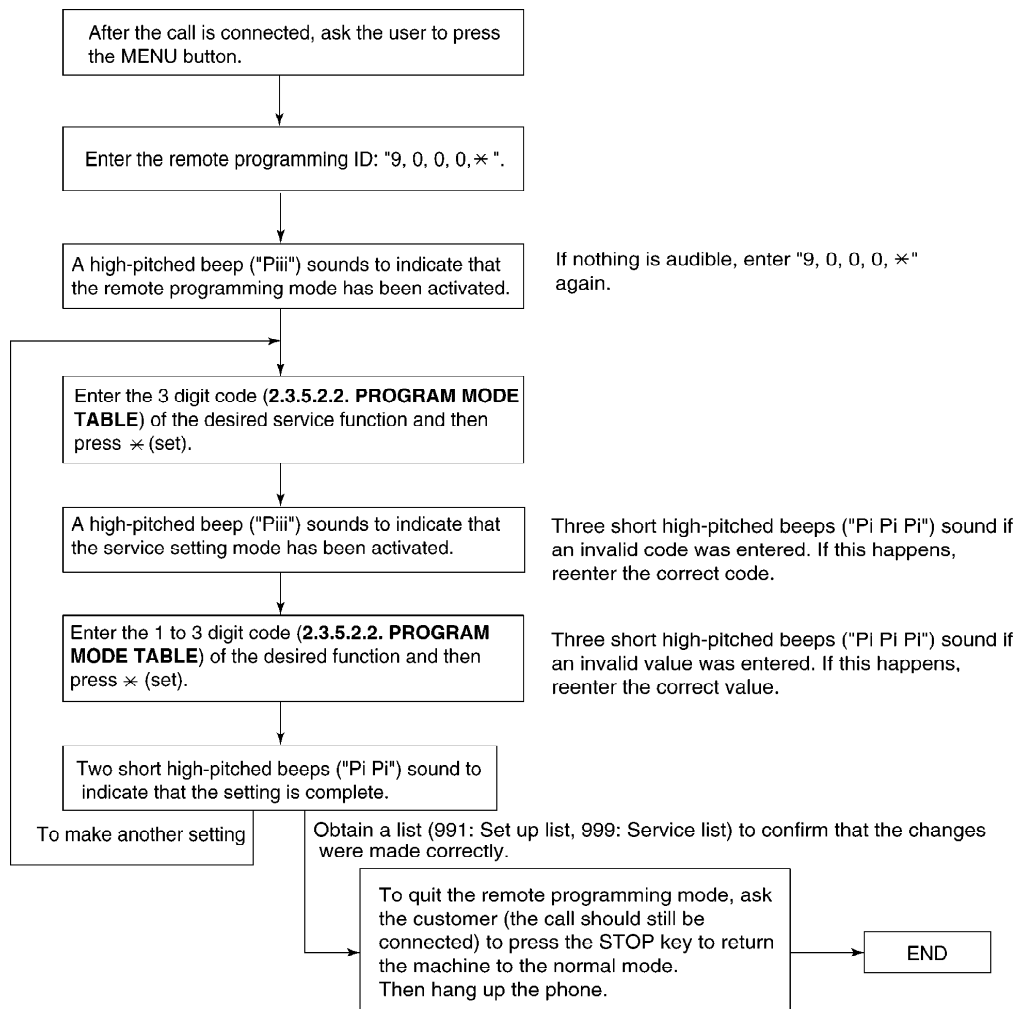
The procedure for changing and listing parameters is described on **ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES()**. Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that the changes were made correctly.

Based on this, the parameters for the desired codes can be changed.

Hint:

Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.

2.3.5.2.1. ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES



CROSS REFERENCE:

PROGRAM MODE TABLE()

2.3.5.2.2. PROGRAM MODE TABLE

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	mm/dd/yy hh/mm	Jan/01/01	NG
002	Your logo	-----	None	NG
003	Your telephone number	-----	None	NG
004	Transmission report mode	1: ERROR / 2: ON / 3: OFF	ERROR	OK
006	TAD/FAX ring count	1~4: 1~4 / 5: TOLL SAVER / 6: RINGER OFF	1	OK
	FAX ring count	1~4	1	NG
	Not available in TEL/FAX mode	-----	-----	NG
010	Recording time	1: VOX / 2: 1MIN	VOX	OK
011	Remote TAD ID	-----	ID=111	NG
013	Dialing mode	1: PULSE / 2: TONE	TONE	OK
014	PC LINK	1:ON / 2:OFF	ON	OK
016	Paper size	1: A4 / 2: LETTER	A4	OK
022	Auto journal print	1:ON / 2:OFF	ON	OK
023	Overseas mode	1: ON / 2: OFF	OFF	OK
025	Delayed transmission	ON / OFF	OFF	NG
030	Silent FAX recognition ring	3 to 6 rings	3	OK
031	Distinctive ring	1: OFF / 2: A / 3: B / 4: C / 5: D	OFF	OK
036	Rx reduction	1: 92% / 2: 86% / 3: 72% / 4: 100%	92%	OK
039	LCD contrast	NORMAL / DARKER	Normal	NG
041	Remote FAX activation code	ON / OFF	ON ID=*9	NG
042	Message alert	1: ON / 2: OFF	OFF	OK
043	REC. time alert	1: ON / 2:OFF	OFF	OK
044	Receive alert	1: ON / 2: OFF	ON	OK
046	Friendly receive	1: ON / 2: OFF	ON	OK
047	FAX voice guidance	1: ERROR / 2: ON / 3: OFF	ON	OK
054	Common greeting MSG. REC. time	1: 16s / 2: 60s	16s	OK
058	Original setting	NORMAL / LIGHT / DARKER	NORMAL	NG
060	Message transfer	ON / OFF	OFF	NG
061	Transfer greeting	CHECK / RECORD / ERASE	CHECK	NG
067	ICM monitor	1: ON / 2: OFF	ON	OK
068	ECM selection	ON / OFF	ON	NG
070	Pager transfer	ON / OFF	OFF	NG
076	Connecting tone	1: ON / 2:OFF	ON	OK
077	Auto answer mode	1: TEL/FAX / 2: FAX Only / 3: TAD/FAX	TAD/FAX	OK
078	TEL/FAX delayed ring	1 to 4 rings	1	OK
080	Set default	YES / NO	NO	NG

Code	Function	Set Value	Default	Remote Setting
501	Pause time set	001~600 x 100msec	050	OK
502	Flash time set	01~99 x 10msec	70	OK
503	Dial speed	1:10pps / 2:20 pps	10pps	OK
510	Vox time	1:8sec / 2:6sec / 3: 4sec	6sec	OK
511	Vox sense	1:High / 2:Low	High	OK
512	Vox mode (KX-FM89CX only)	1:A / 2:B	A	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	OK
521	International mode select	1:ON / 2:OFF	ON	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1:0km / 2:1.8km / 3:3.6km / 4: 7.2km	0km	OK
524	Transmission equalizer select	1:0km / 2:1.8km / 3:3.6km / 4: 7.2km	0km	OK
533	Setting the number of times that message transfer is redialed.	00~99	03	OK
534	Setting of the message transfer/pager call redial interval	001~999	065	OK
550	Memory clear	-----	-----	NG
551	ROM check	-----	-----	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	OK
553	Monitor on FAX communication	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	-----	-----	NG
555	Scanner test	-----	-----	NG
556	Motor test	-----	-----	NG
557	LED test	-----	-----	NG
558	LCD test	-----	-----	NG
559	Document jam detection	1:ON / 2:OFF	ON	OK
561	Key test	-----	-----	NG
570	Break % select	1:61% / 2:67%	61%	OK
571	ITS auto redial time set	00~99	05	OK
572	ITS auto redial line disconnection time set	001~999sec	065	OK
573	Remote turn-on ring number	01~99	15	OK
580	TAM continuous tone detection	1:ON / 2:OFF	ON	OK
590	FAX auto redial time set	00~99	05	OK
591	FAX auto redial line disconnection time set	001~999sec	065	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300 bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection	1:1st / 2:2nd	1st	OK
595	Receive error limit value	001~999	100	OK
596	Transmit level set	-15~00dBm	10	OK
598	Receiving Sensitivity	20~48	40	OK
599	ECM Frame size	1:256/ 2:64	256byte	OK

Code	Function	Set Value	Default	Remote Setting
624	AT ring time out	1:3sec / 2:5sec	3sec	OK
717	Transmit speed select	1:14400/2:12200/3:9600/ 4:7200/ 5:4800/ 6:2400	14400bps	OK
718	Receive speed select	1:14400/2:12200/3:9600/ 4:7200/ 5:4800/ 6:2400	14400bps	OK
719	Ringer off in TEL/FAX mode	1:ON / 2:OFF	ON	OK
721	Pause tone detect	1:ON / 2:OFF	ON	OK
722	Redial tone detect	1:ON / 2:OFF	ON	OK
724	PC-FAX ATD busy tone detect	1:ON / 2:OFF	OFF	OK
731	CPC mode	1:A / 2:B / 3:OFF	A	OK
732	Auto disconnect	1:350ms / 2:1800ms / 3:OFF	350msec	OK
745	Power on film feed	1:ON / 2:OFF	ON	OK
763	CNG detect time for friendly reception	1:10s / 2:20s / 3:30s	30s	OK
771	T1 timer	1:35s / 2:60s	35s	OK
774	T4 timer	00~99 x 100ms	00	OK
775	Monitoring of message transfer	1:ON / 2:OFF	OFF	OK
784	Voice prompt	1:Start	-----	NG
815	Sensor & VOX test	-----	-----	NG
841	Digital SP-Phone RX & TX check	1:SP-Phone	-----	NG
852	Print test pattern	-----	-----	NG
853	Top margin	1~9	5	OK
854	Left margin	1~8	5	OK
870	Serial port self test	-----	-----	NG
880	History list	1:Start	-----	NG
881	Journal 2	1:Start	-----	NG
882	Journal 3	1:Start	-----	NG
890	TEL/FAX ring back tone	1:ON / 2:OFF	ON	OK
895	TEL/FAX Receive mode	1:TAD/FAX / 2:FAX	FAX	OK
991	Setup list	1:Start	-----	OK
994	Journal list	1:Start	-----	OK
995	Journal 2 list	1:Start	-----	OK
996	Journal 3 list	1:Start	-----	OK
998	History list	1:Start	-----	OK
999	Service list	1:Start	-----	OK

OK means "can set".

NG means "can not set".

Note:

Refer to **SERVICE FUNCTION TABLE** () for descriptions of the individual codes.

Example:

If you want to set value in the "004 Transmission report mode", press the dial key number 1,2 or

3 corresponding to the Set Value you want to select. (1:ERROR/2:ON/3:OFF)

2.3.6. DIGITAL BOARD SECTION

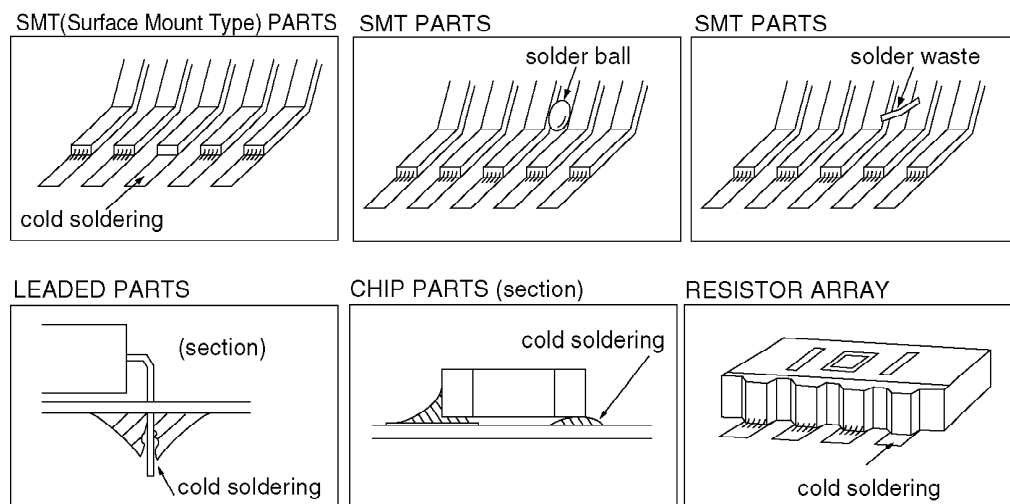
When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.

The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)

The first step is to check the power source. If there is no problem with the power supply unit, the problem may lie in the digital unit (main board).

As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.

Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).



Note:

1. Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.
2. Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially SRAM, DRAM and ROM) malfunctions are extremely rare after installation in the product.)

This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.

Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.

Even if you don't have such a measuring instrument, by checking each main signal line and resoldering it, in many cases the problem will be resolved.

An explanation of the main signals (for booting up the unit) is presented below.

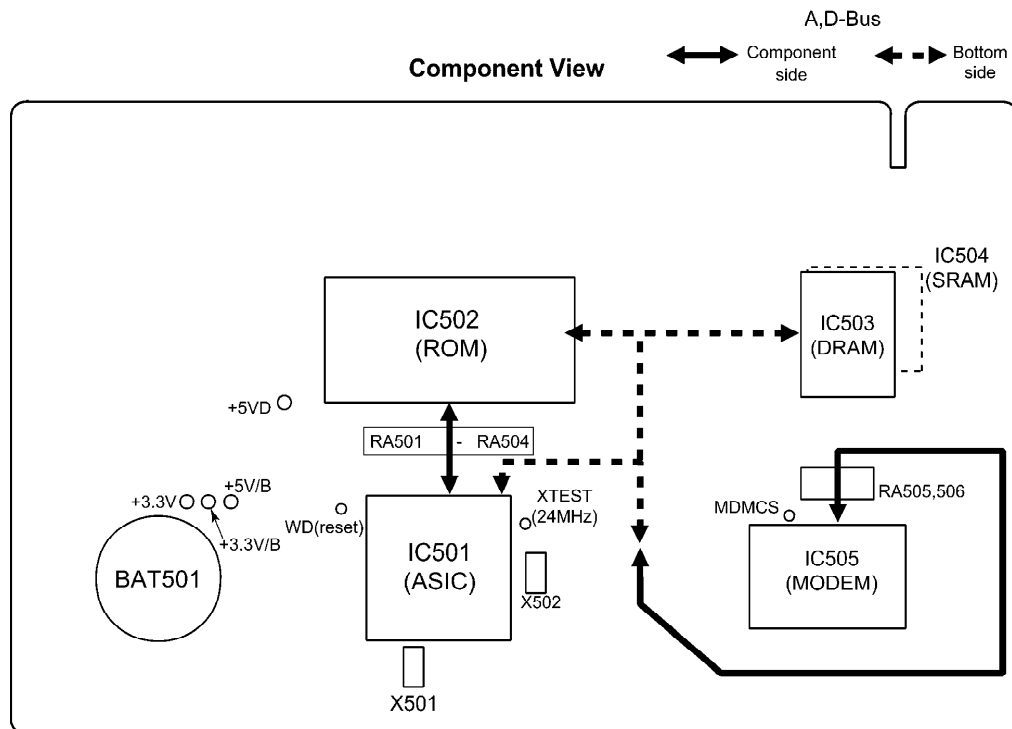
Don't replace ICs or stop repairing until checking the signal lines.
An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?

Please refer to **DIGITAL BLOCK DIAGRAM** ().

The ASIC (IC501) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the ROM (IC502), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address. It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs. These signal lines are all controlled by voltages of 5V (H) or 0V (L).

2.3.6.1. DIGITAL BLOCK DIAGRAM



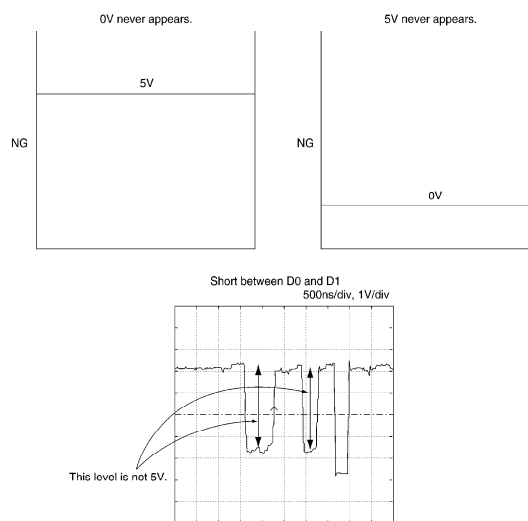
You also need to check the signal lines listed here [List 1] when the unit fails to boot up the system. Those signal lines should remain normal. Other signal lines are not directly related to that failure even if they have faults or troubles.

[List 1]

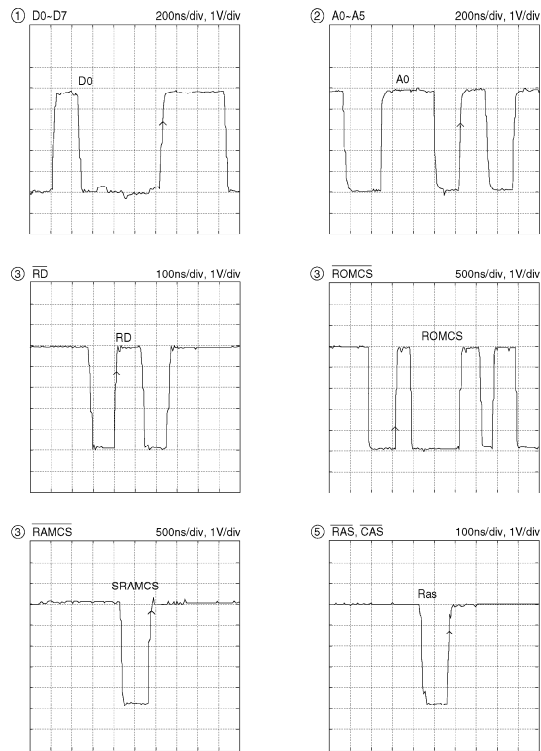
- | | | |
|---|--------------------|-------------------------------------|
| ① | D0~D7 | (Data Bus) |
| ② | A0~A15 | (Address Bus) |
| ③ | \overline{RD} | (Read Signal) |
| | \overline{ROMCS} | (ROM Select Signal) |
| | \overline{WR} | (Write Signal) |
| | \overline{RAMCS} | (SRAM Select Signal) |
| ④ | RBA0~RBA5 | (Bank Address Signal) |
| ⑤ | \overline{RAS} | (DRAM Row Address Strobe Signal) |
| | \overline{CAS} | (DRAM Column Address Strobe Signal) |
| ⑥ | \overline{MDMCS} | (Modem Select Signal) |

As long as these signals remain normal, once the power is turned on, each IC can repeatedly output 5V (H) and 0V (L). The following shows NG and normal wave patterns.

NG Wave pattern (Refer to NG EXAMPLE)



Normal Wave Patterns



Remarks:

When you use an oscilloscope to judge whether a signal to be tested is normal or NG, perform the signal check in exactly the same order as in [List 1]. (If the ASIC fails to access the ROM, the ASIC cannot access SRAM or DRAM normally.)

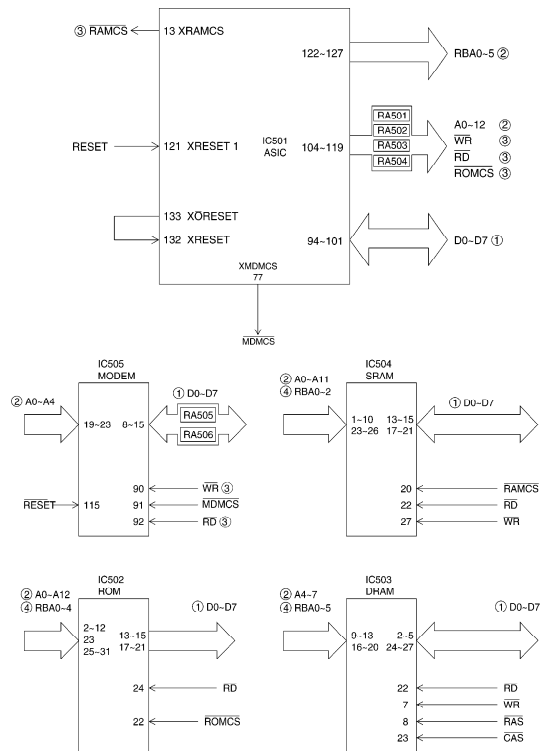
The digital circuit actually operates according to the timing combinations of these signals. If the timing of these signals is even slightly delayed, the circuit will not work. Nor will it if the IC is defective and the output voltage level is not normal although the timing of these signals is accurate enough to meet the specifications. (Make sure that your oscilloscope is calibrated before starting a test.)

Therefore, it is imperative to confirm whether each IC outputs the signal at the correct level. (See the I/O Pin No. Diagram.) The signal level should be constantly output at between 5V (H) and 0V (L) as described earlier.

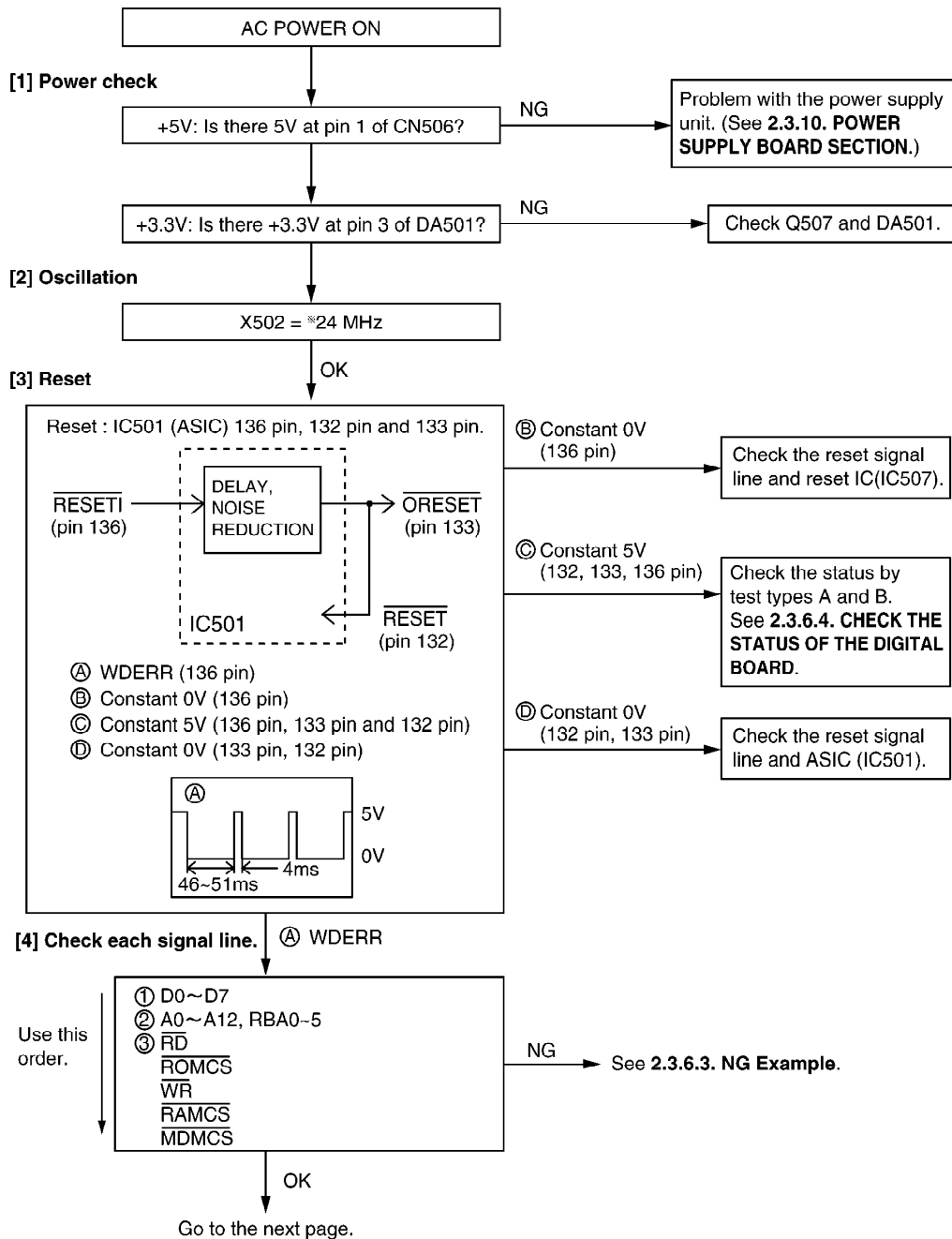
Note:

Simply check the output level and make sure if the IC repeatedly outputs the signal at between 5V (H) and 0V (L).

I/O and Pin No. Diagram



After the power is turned on, the ASIC initializes and checks each IC. The ROM, SRAM, and modem are checked. If initialization fails for the ICs, the system will not boot up. In this case, please find the cause as follows.

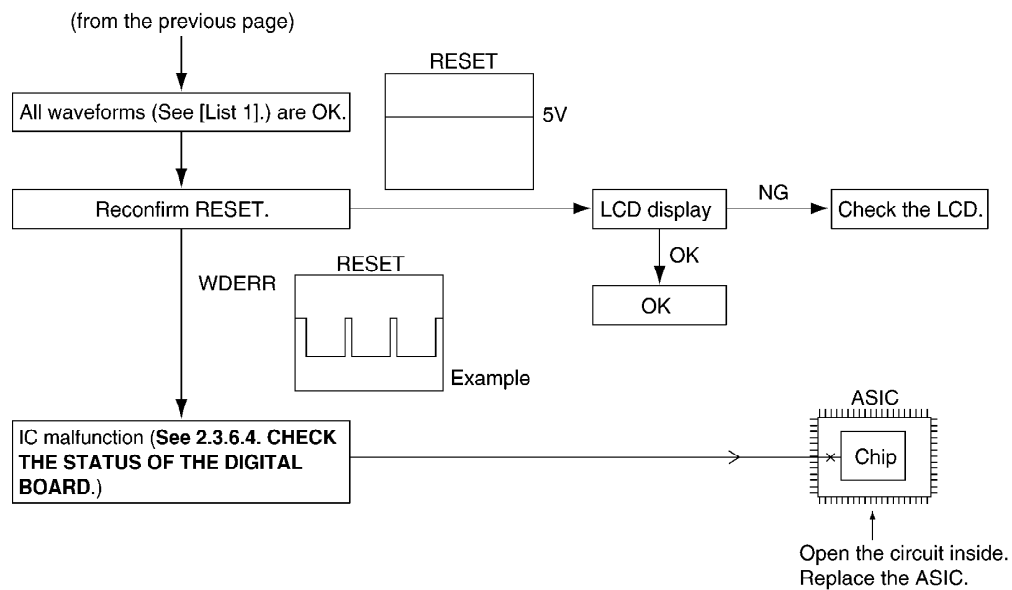


CROSS REFERENCE:

NG EXAMPLE()

CHECK THE STATUS OF THE DIGITAL BOARD()

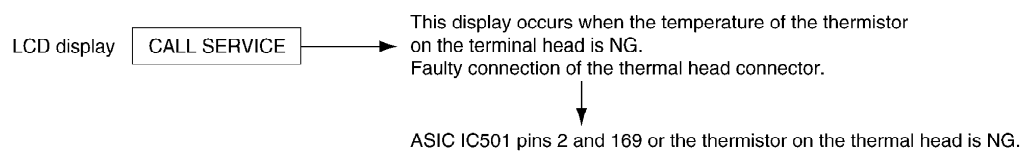
POWER SUPPLY BOARD SECTION()



CROSS REFERENCE:

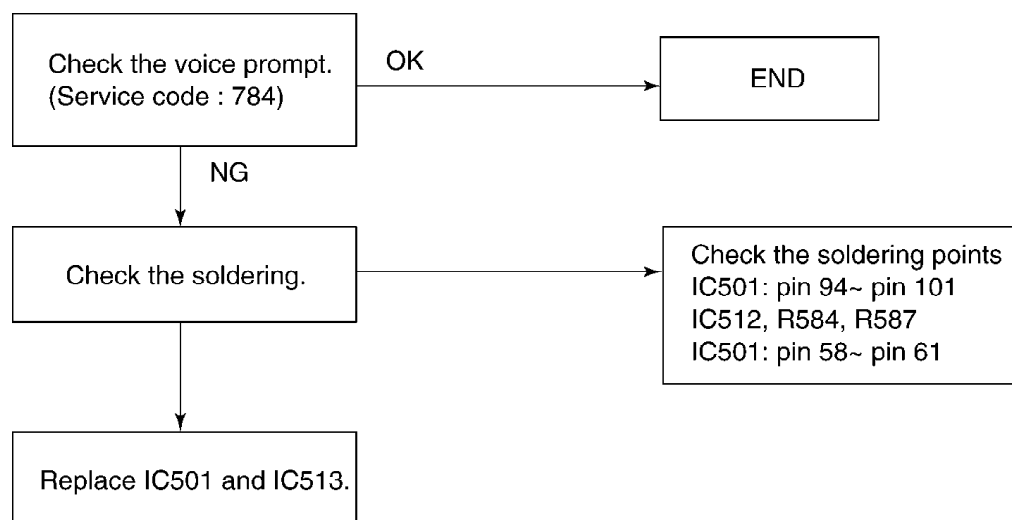
CHECK THE STATUS OF THE DIGITAL BOARD()

Other NG example while the power is ON and the LCD displays the following.



2.3.6.2. FLASH MEMORY (IC501)

If the unit is working correctly but the **VOICE GUIDANCE (voice prompt)** is not audible, you should check the Flash Memory.



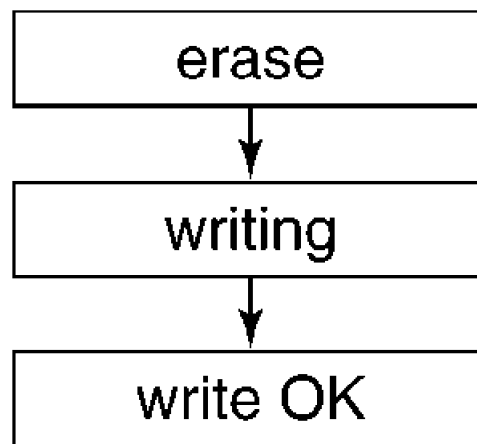
A voice message is pre-recorded in the Flash Memory (IC512). So, when you find an IC512 malfunction and replace it with a new one. You have to pre-record the voice message by using a

special ROM.

How to Use the Special ROM
(Voice Message Recording ROM)

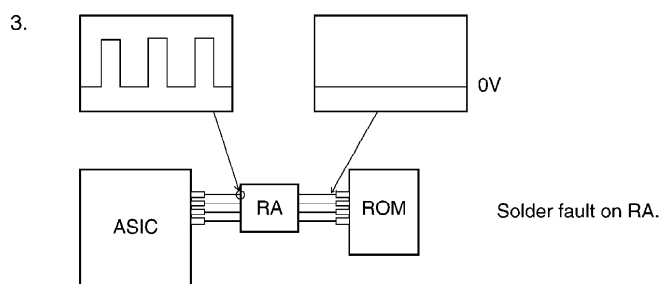
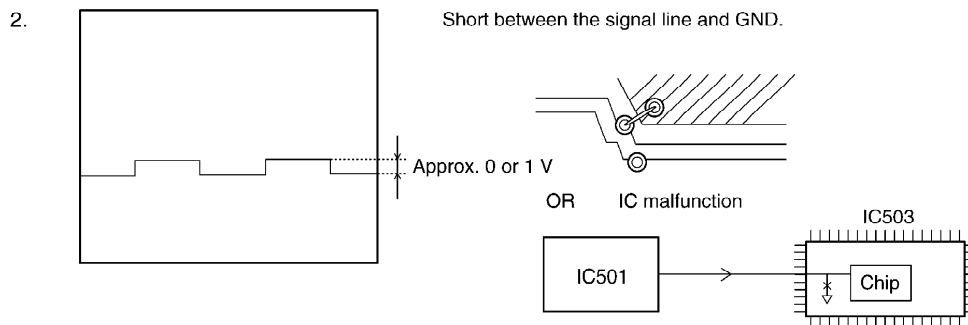
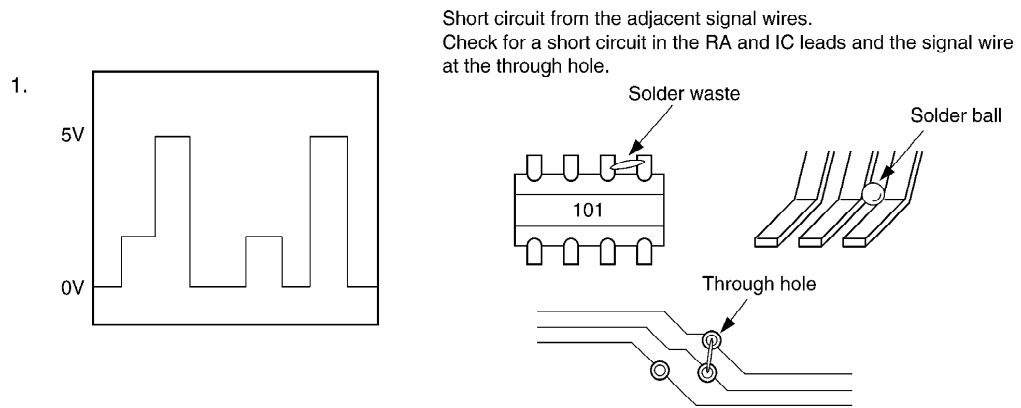
1. Turn the AC power OFF.
2. Replace the regular system ROM with the special ROM.
3. Turn the AC power ON.
4. The Voice Message Recording starts automatically.

LCD changes



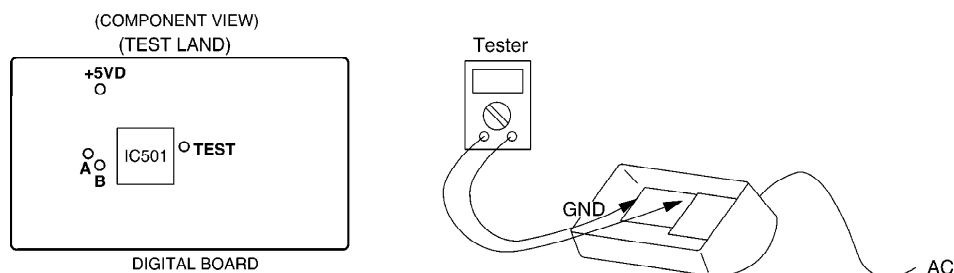
5. Turn the AC power OFF.
6. Replace the special ROM with the regular system ROM.

2.3.6.3. NG EXAMPLE



2.3.6.4. CHECK THE STATUS OF THE DIGITAL BOARD

Please check the status (voltage) of test lands **A** and **B**.
The result may tell you a defective point.



- Turn off the power supply.
- Short using a metallic object, such as tweezers, between the **TEST** point and **+5V** land, and turn on the AC power for a few seconds. And then remove a metallic object.
- Check the following voltages using an oscilloscope or tester.
- To cancel the status check mode, turn off the AC power.

Defective point	Check point voltage		Check items
	A	B	
RTC (IC501)	0V	0V	IC501(RTC is included in IC501)
DRAM (IC503)	0V	5V	IC503(8,23 pin), R556, R557, C565, C574, IC501(88, 89 pin), L518
MODEM (IC505)	5V	0V	IC501(77 pin), IC505(115~117, 90~92 pin), RA505, RA506
ALL OK	5V	5V	

- This indicates that the Add/Data Bus, RAM, ROM, MODEM, and ASIC are all connected to the ASIC properly and that control from the ASIC is possible.

Please check the soldering and conduction of these components.
If there is no problem, replace the ICs.

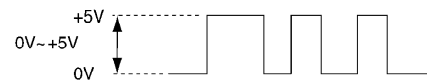
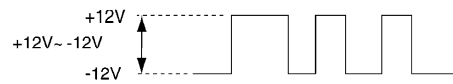
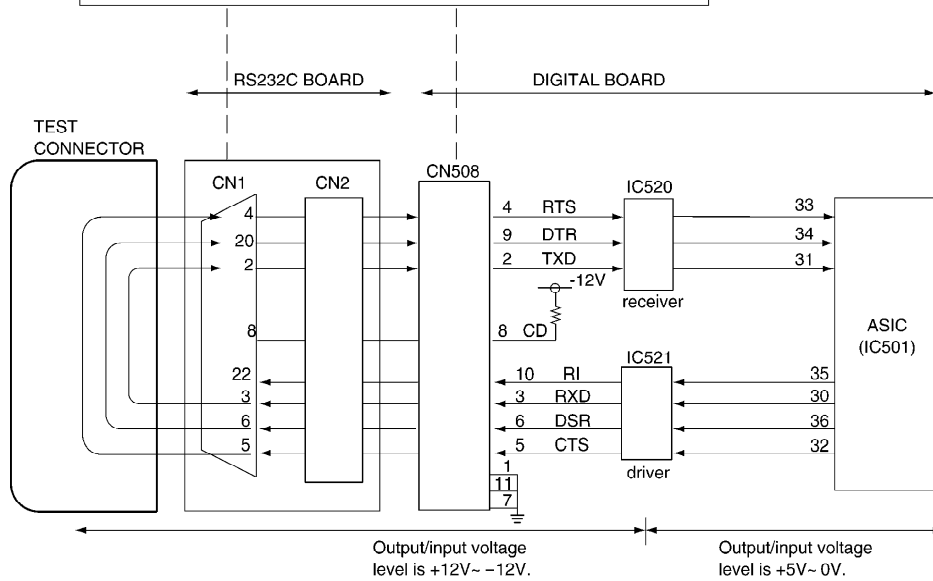
If you still have a problem with the digital board,
please refer to **NG wave pattern**.

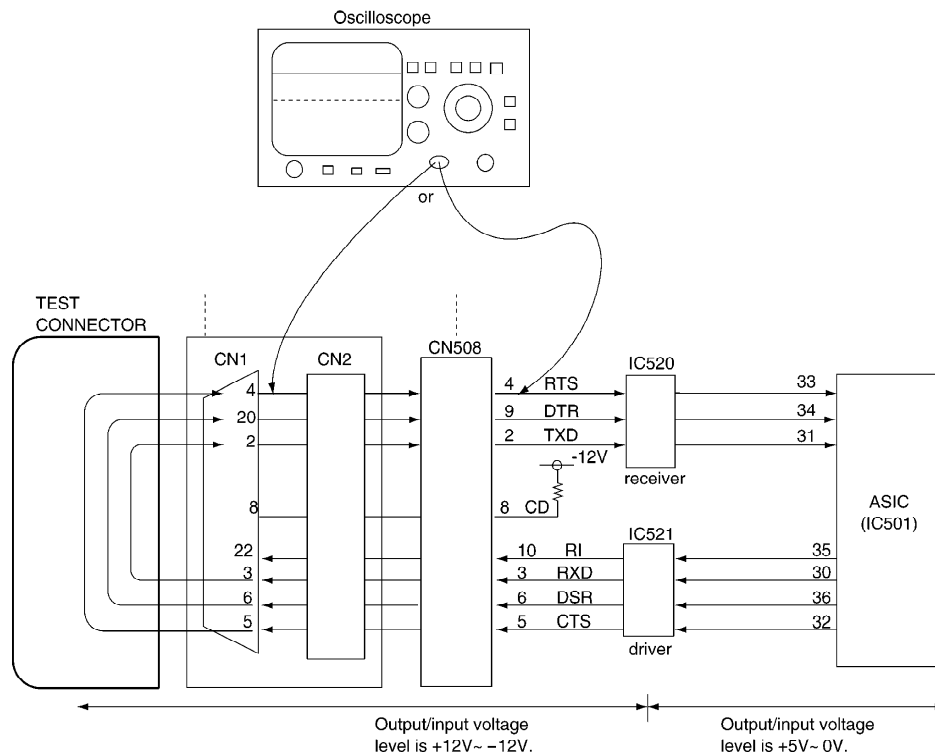
2.3.7. RS-232C SERIAL COMMUNICATION

This model has a communication port designed for RS-232C serial communication. (The EIA standards specify the interface cable type (No. RS232C) and the voltage levels.
If you use the **TEST CONNECTOR**, you can easily check the communication port without a PC. The connector should be wired so that the output signal can return to the input port. (The transmitted data is received by the unit.) You do not need to do any difficult operations. You can get a test result by a simple key operation (#9000 ~~X~~ 870).
The result (OK or NG) is displayed on LCD.

Displayed "NG 1" means that DTR, DSR, RTS, CTS is not good.

Displayed "NG 2" means that communication data error (TXD, RXD) occurred.





The electric circuit for this RS-232C port is simple. It is logically controlled by ASIC IC501, driver IC521 and receiver IC520.

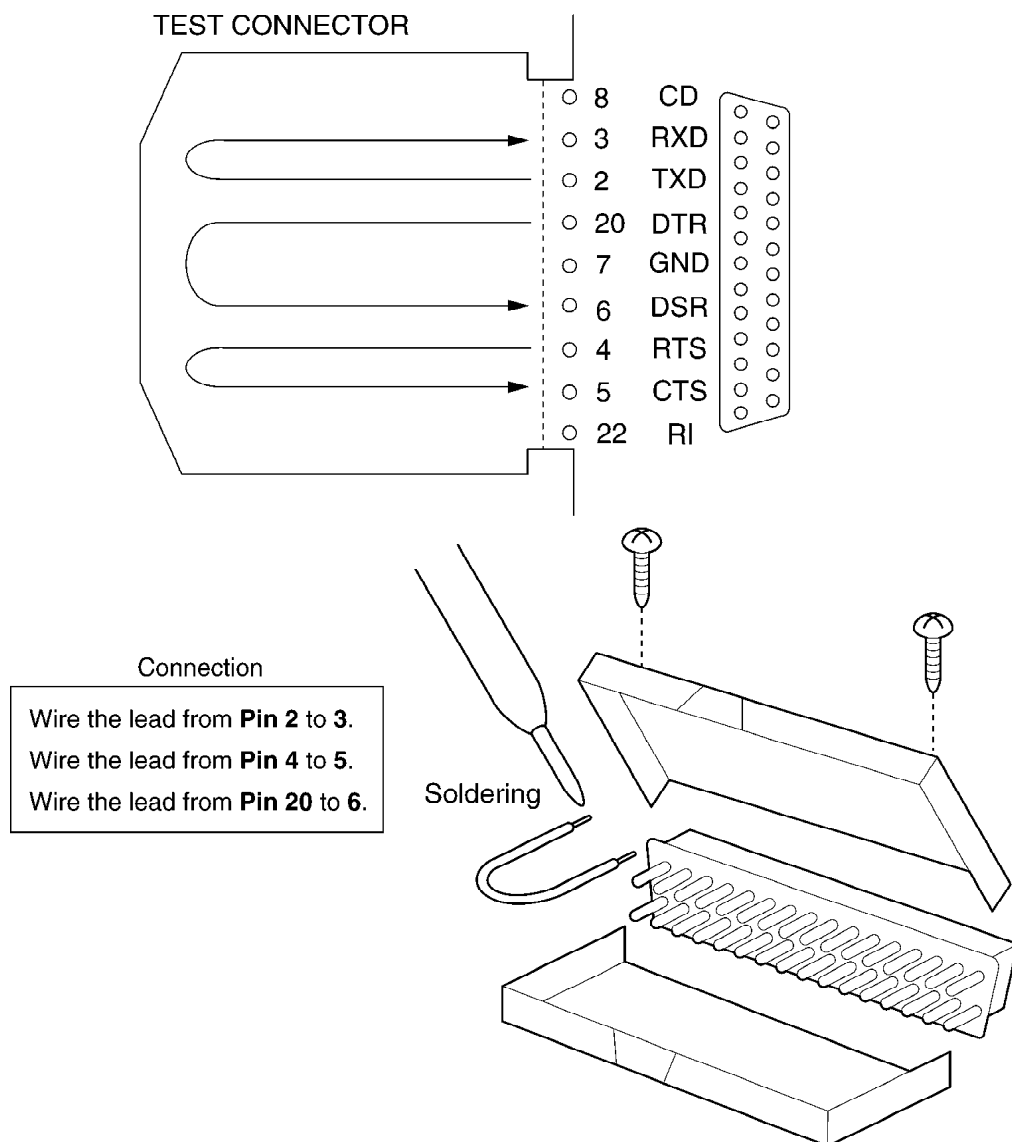
Check voltage while testing the RS-232C cable.

If the voltage level of signal at IC501, IC520 and IC521 is not 0V ~ 5V, replace IC501.

If the voltage level of signal at CN508 is not -15V ~ +15V, replace IC520 and IC521.

The TEST CONNECTOR is provided as an option.

Or you can get a connector available on the market and make the TEST CONNECTOR as shown below.

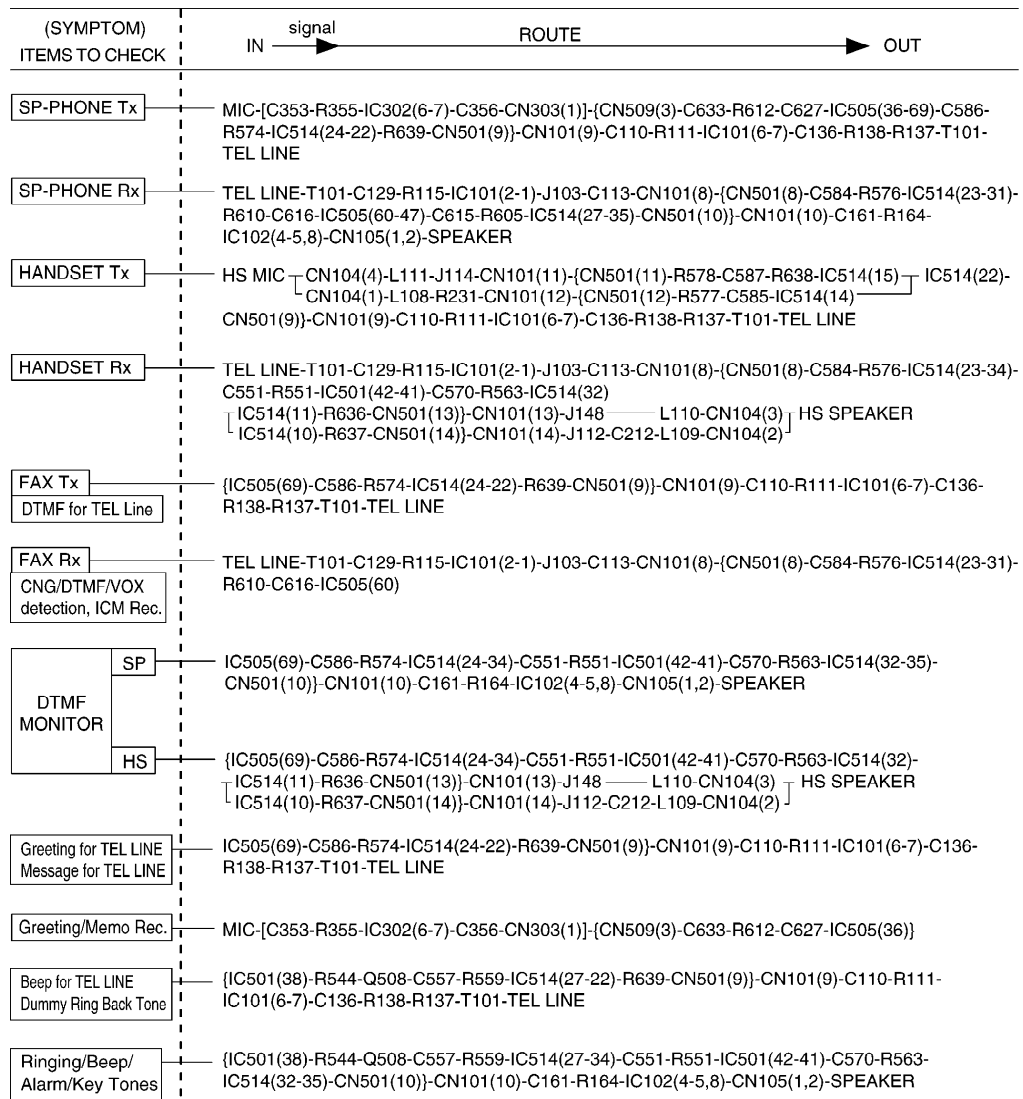


2.3.8. ANALOG BOARD SECTION

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

2.3.8.1. CHECK SHEET

2.3.8.1.1. FOR KX-FM89BX

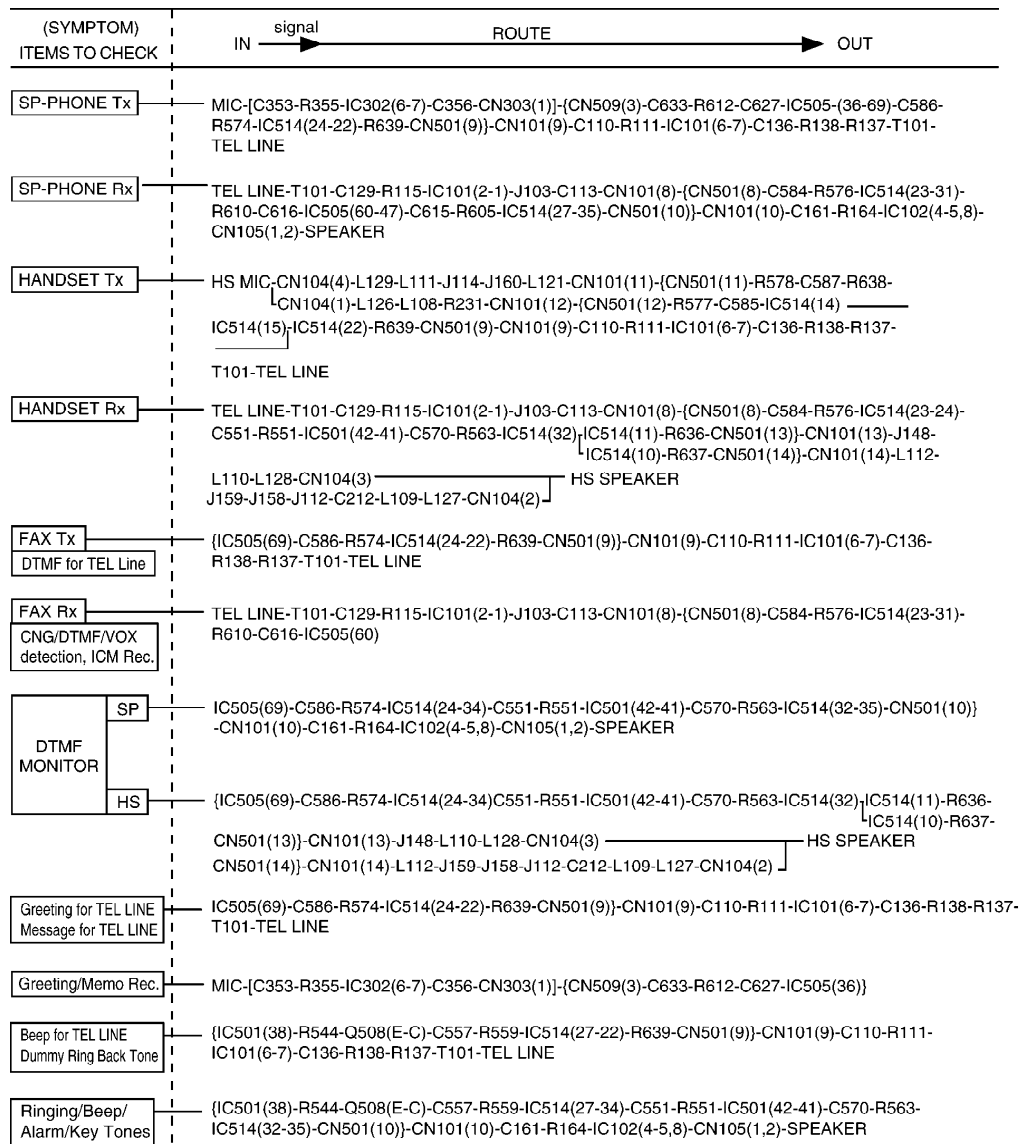


Note:

{ }: Inside the digital board

[]: Inside the operation board

2.3.8.1.2. FOR KX-FM89CX



Note:

{ }: Inside the digital board

[]: Inside the operation board

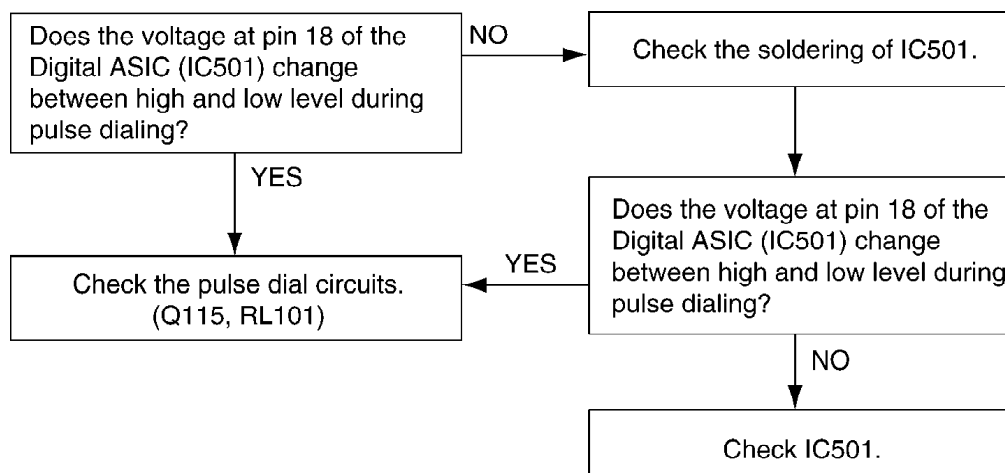
2.3.8.2. DEFECTIVE ITS (Integrated Telephone System) SECTION

1. No handset and speakerphone transmission / reception

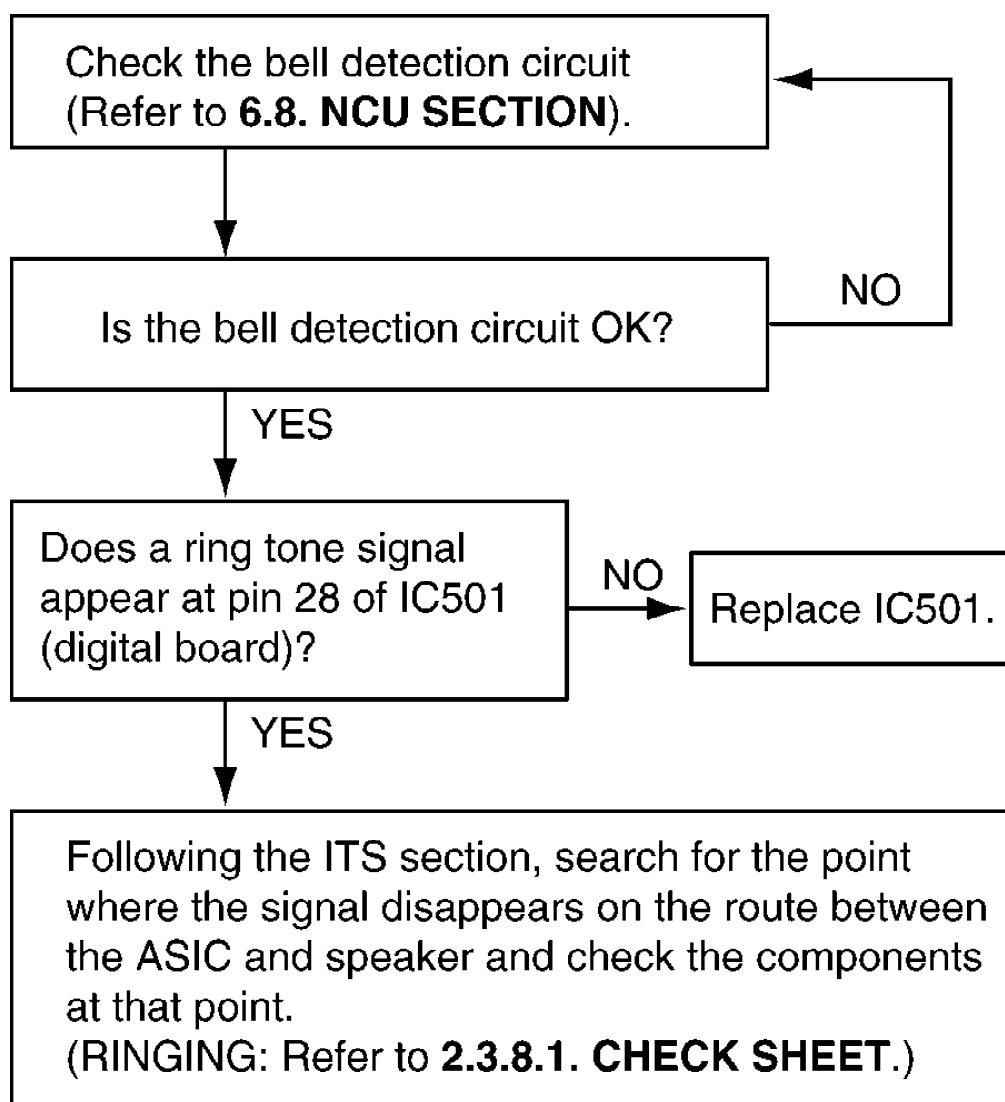
Perform a signal test in the ITS or the NCU section and locate a defective point (where the signal disappears) on each route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving). Check the components at that point. **CHECK SHEET ()** is useful for this

investigation.

2. No pulse dialing



3. No ring tone (or No bell)

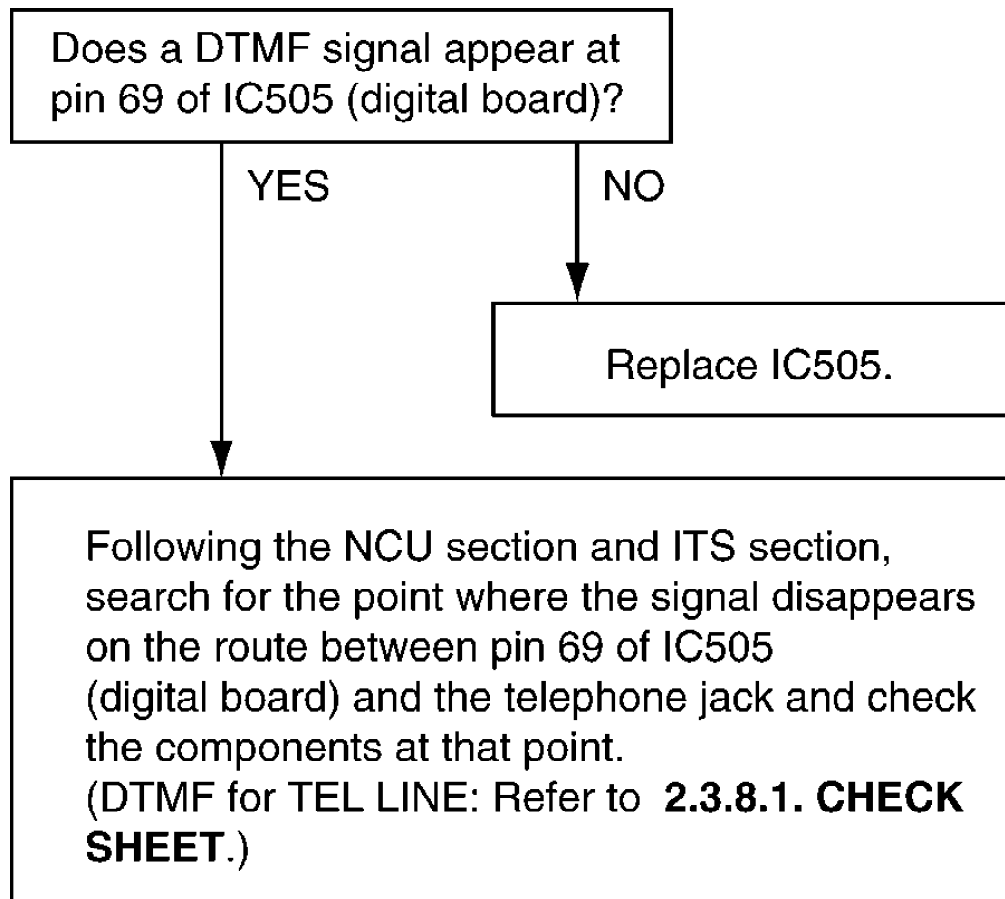


CROSS REFERENCE:

[CHECK SHEET \(\)](#)

[NCU SECTION\(\)](#)

4. No tone dialing



CROSS REFERENCE:

[CHECK SHEET \(\)](#)

2.3.9. DIGITAL SPEAKERPHONE

The digital speakerphone has different features from the analog speakerphone.

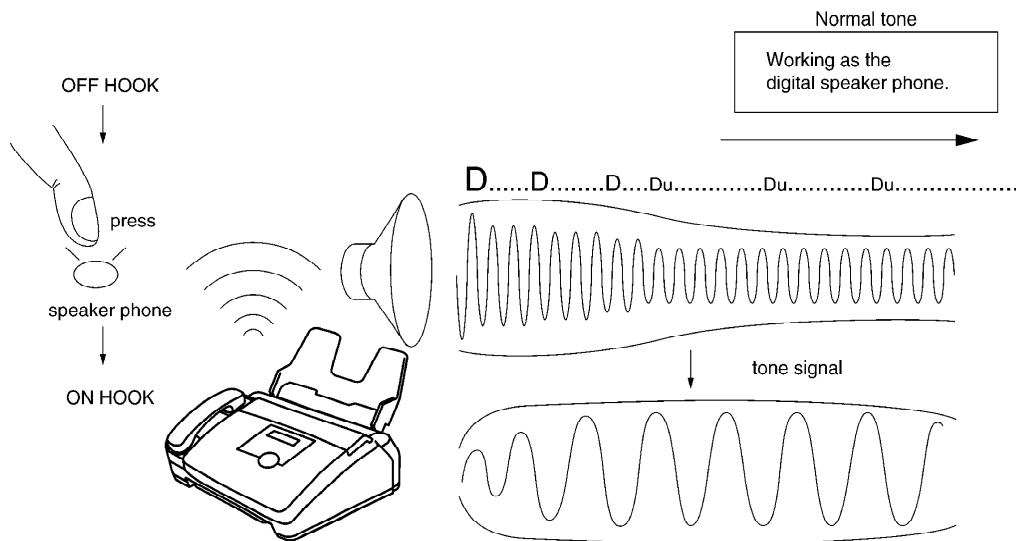
The analog speakerphone switches between Tx or Rx. Either Tx or Rx is able to pass through a telephone line or speaker, depending on the Tx and Rx signal (voice) level. The higher-level signal (either TX or RX) can pass through the route.

Therefore, you never hear the other party's voice while you are talking. However, the digital speakerphone allows you to hear the other party's voice while you are talking. So both Tx and Rx are active at the same time. There is also a difference in the troubleshooting procedures between the two types.

At the start of communication, during the initial 2~3 correspondences, the digital speakerphone performs half-duplex operation, alternating between transmission (Tx) and reception (Rx). Then

duplex communication becomes available.

Learning occurs during the initial 2~3 correspondences in order to set the appropriate parameters for duplex communication.

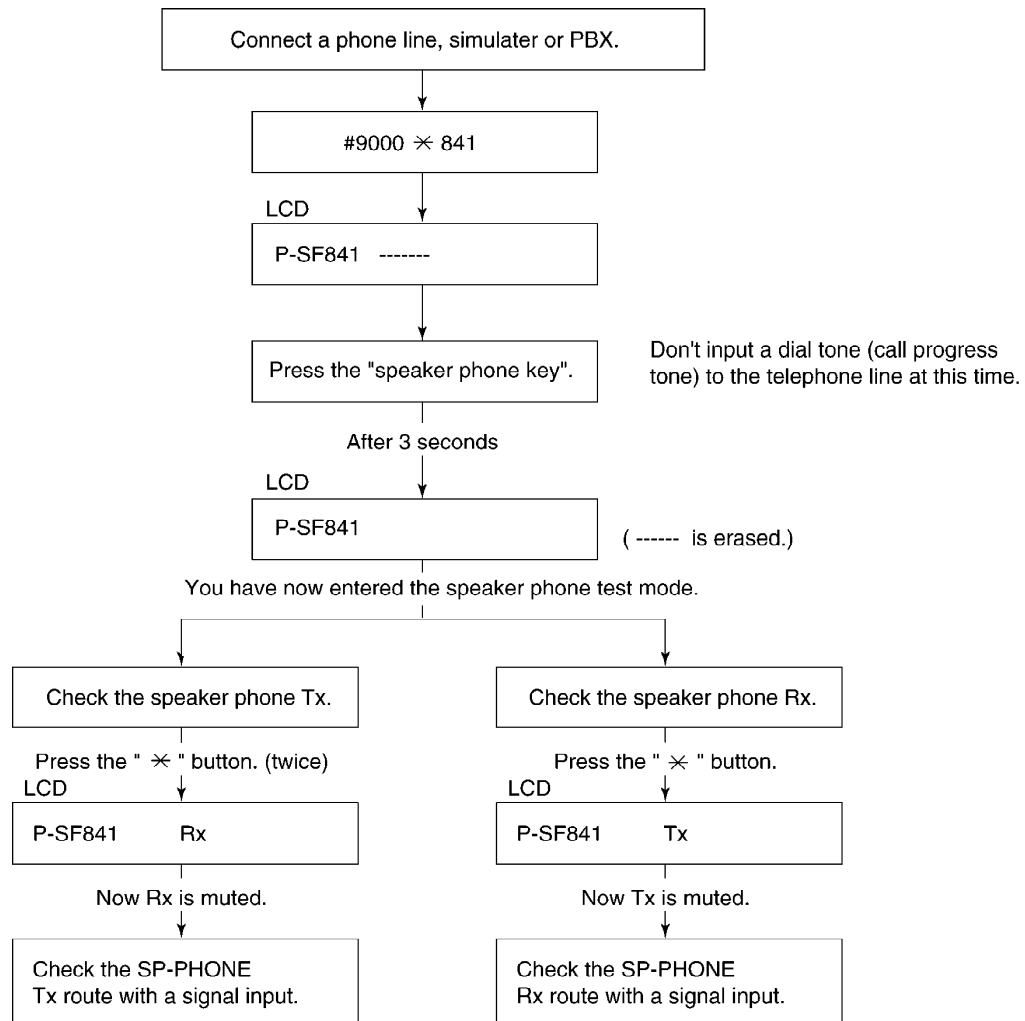


You cannot check the digital speaker phone by the signal route test mentioned in the Analog Board Section because the level is always changing as stated above.

Therefore, there is a service function for this troubleshooting. In this service mode, you can set the mute to either Tx or Rx. Then you can check the signal route of the speaker phone Tx or the speaker phone Rx without any disturbances.

HOW TO USE THE 841 SERVICE FUNCTION for THE DIGITAL SPEAKER PHONE

Please check by using the service function #9000 ✕ 841.



CROSS REFERENCE: / **ANALOG BOARD SECTION** ().

2.3.10. POWER SUPPLY BOARD SECTION

2.3.10.1. KEY COMPONENTS FOR TROUBLESHOOTING

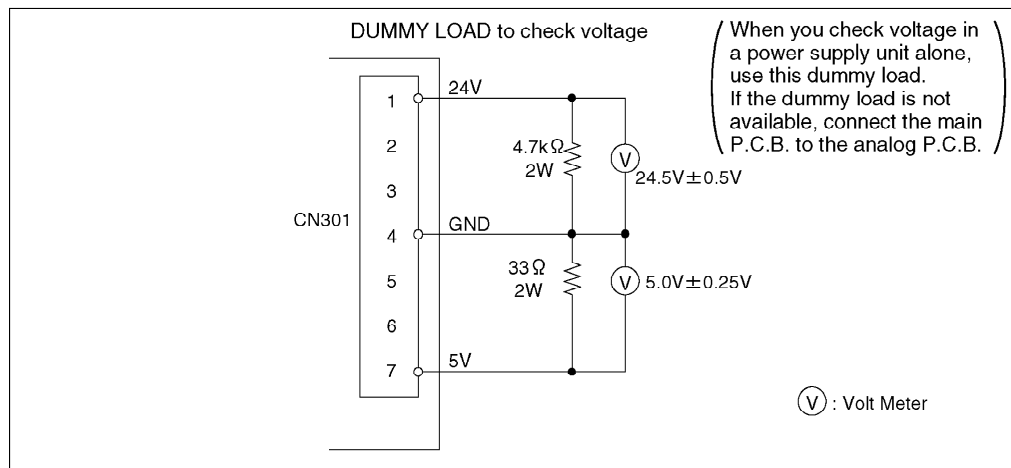
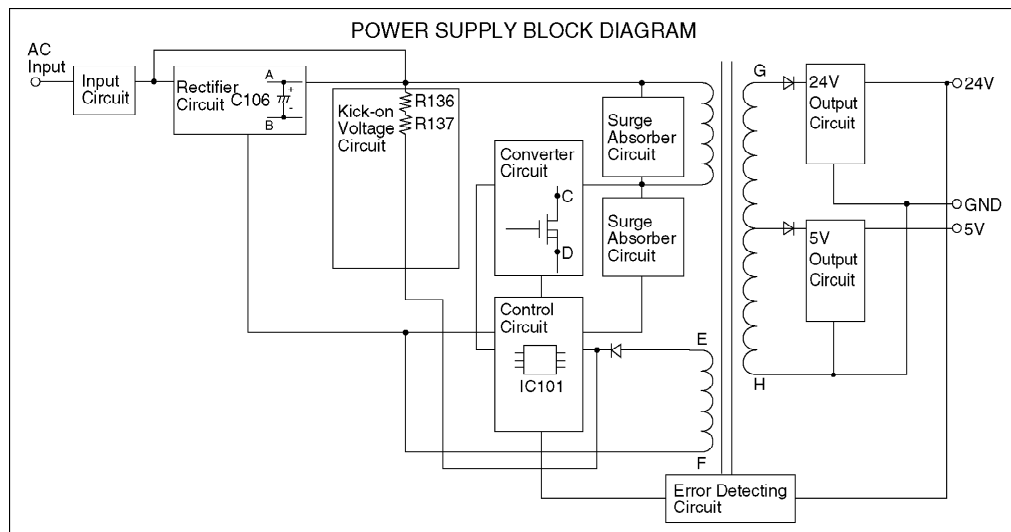
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.

This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

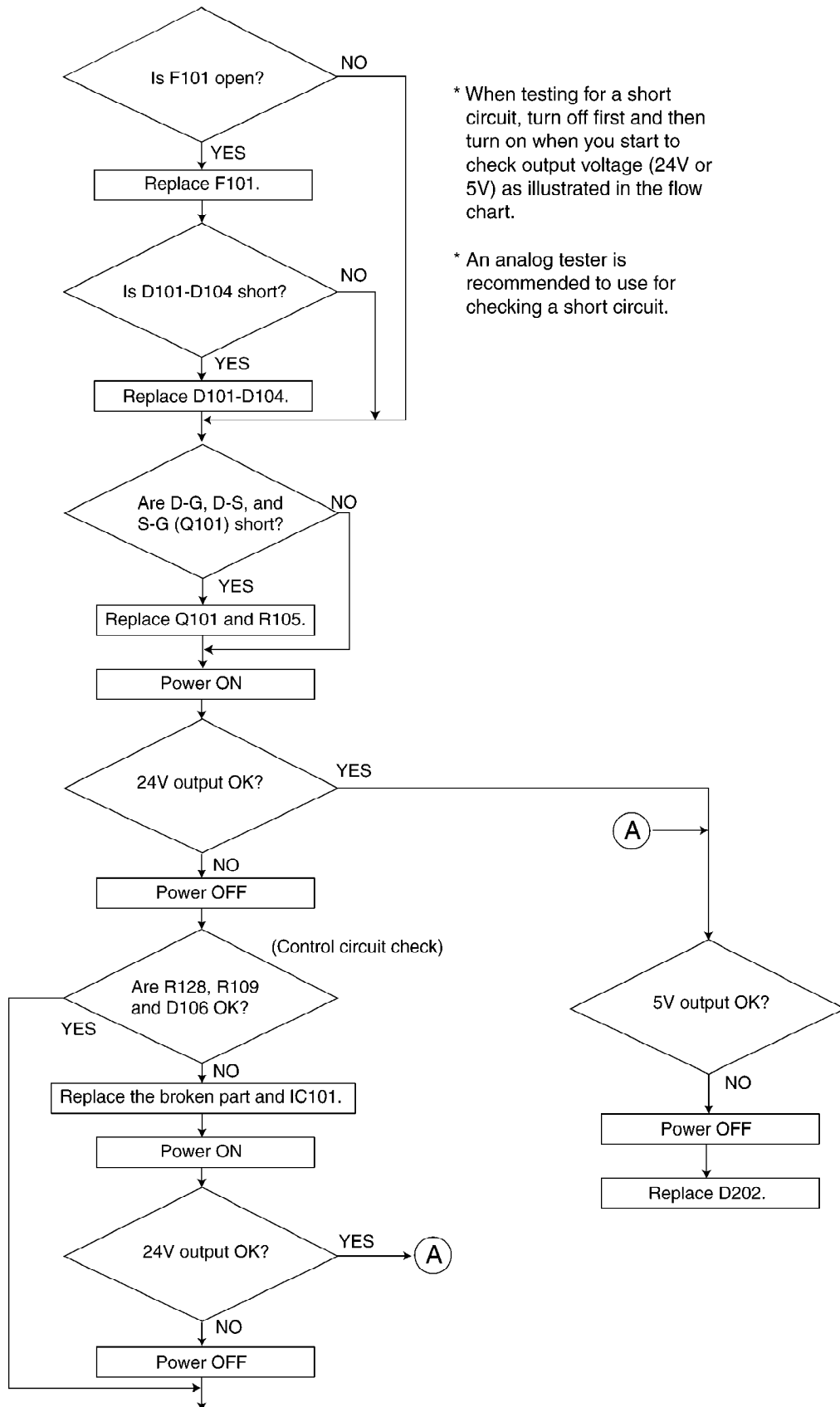
Caution:

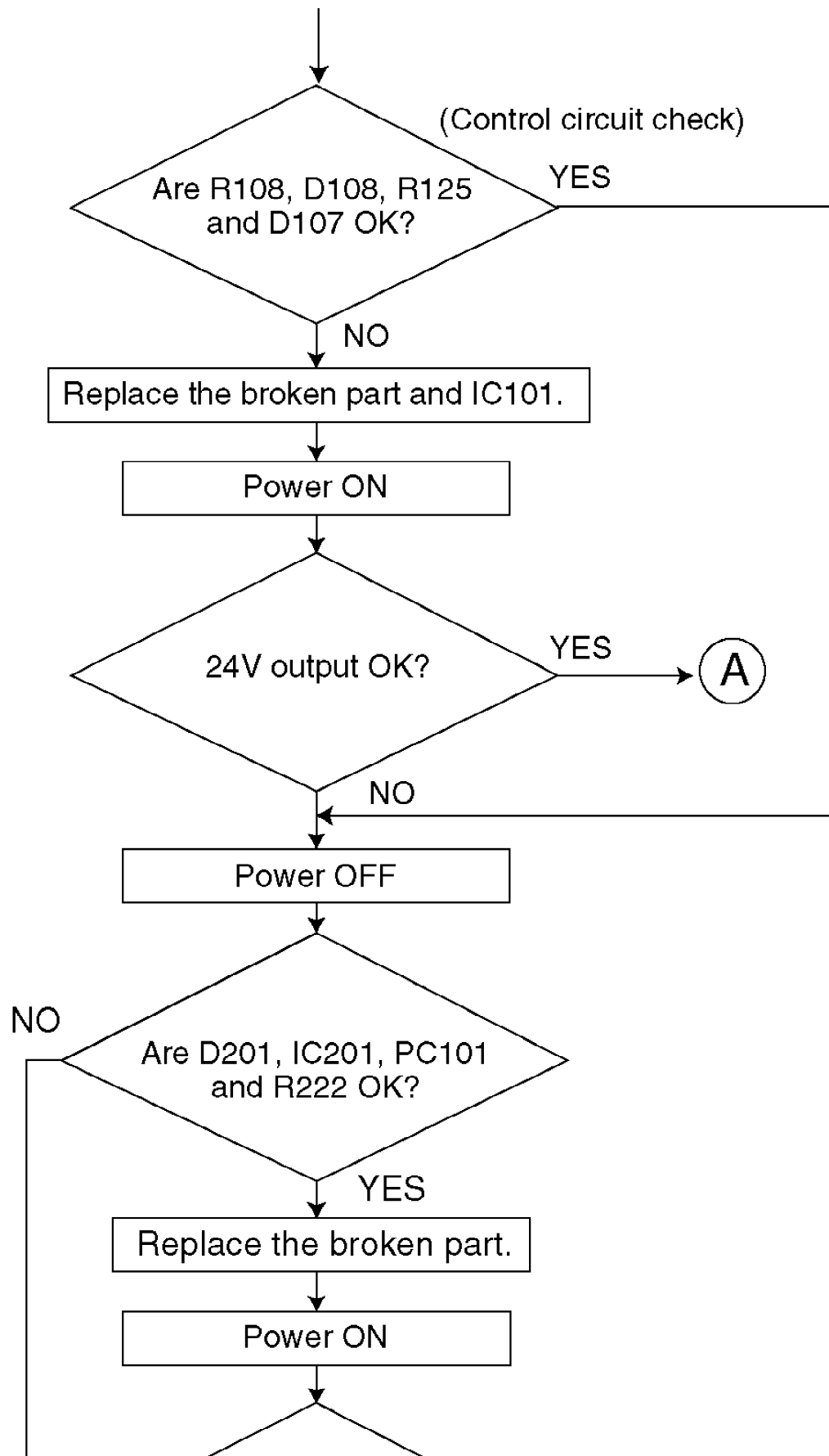
If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

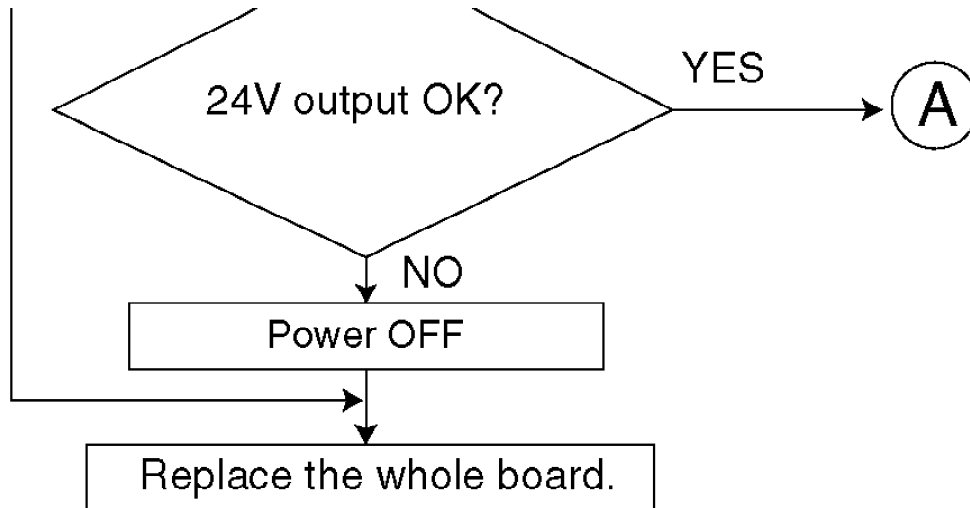
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.



2.3.10.2. TROUBLESHOOTING FLOW CHART







2.3.10.3. BROKEN PARTS REPAIR DETAILS

(D101, D102, D103, D104)

Check for a short-circuit in terminal 4. If D101, D102, D103 and D104 are short-circuits, F101 will melt (open).

In this case, replace all of the parts (D101, D102, D103, D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.

This is due to a very high voltage through the Gate circuit which is composed of R128, R109, D106 and IC101.

You should change all of the parts listed as follows.

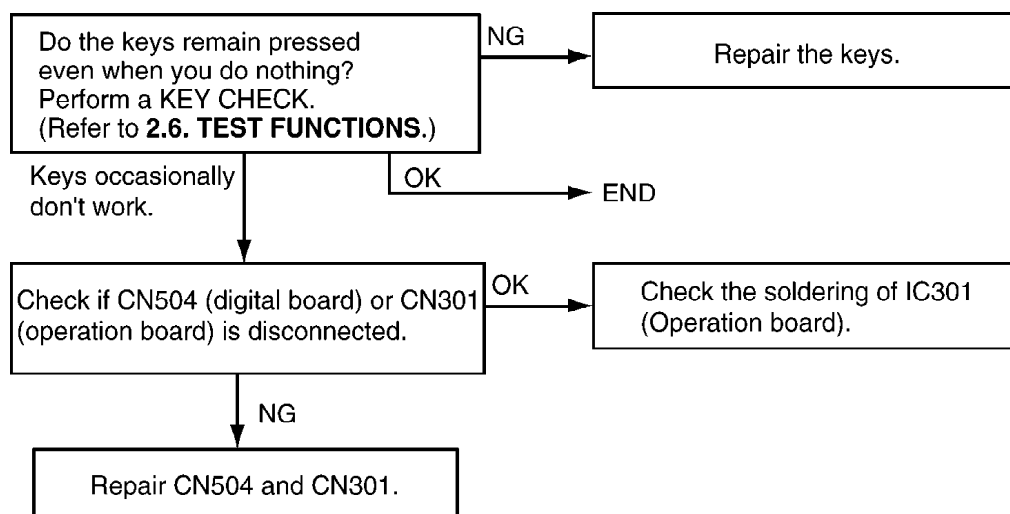
F101, Q101, R128, R109, D106, IC101

(D201)

If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

2.3.11. OPERATION PANEL SECTION

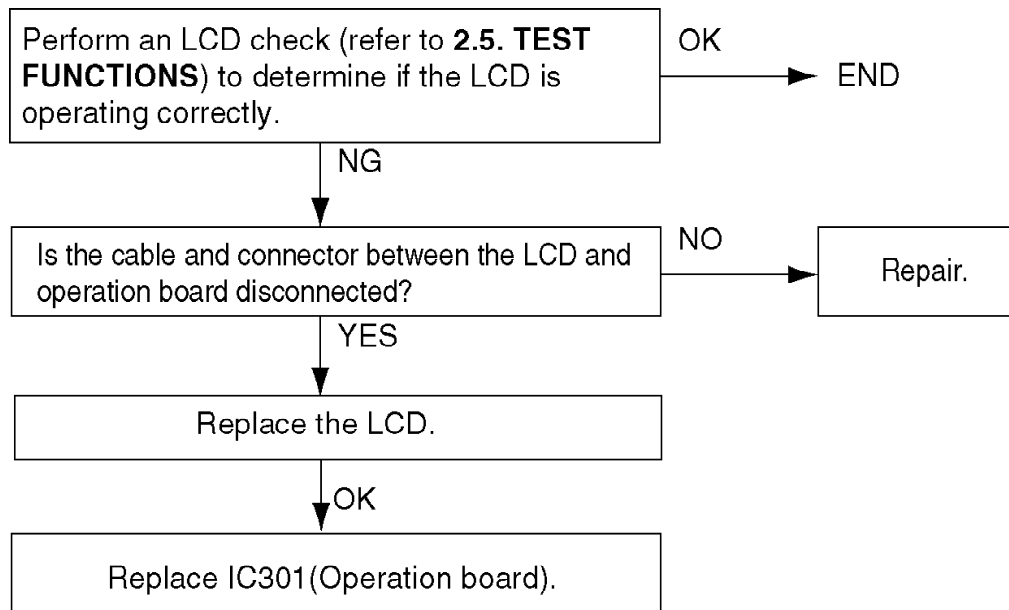
2.3.11.1. NO KEY OPERATION



CROSS REFERENCE:

TEST FUNCTIONS()

2.3.11.2. NO LCD INDICATION



CROSS REFERENCE:

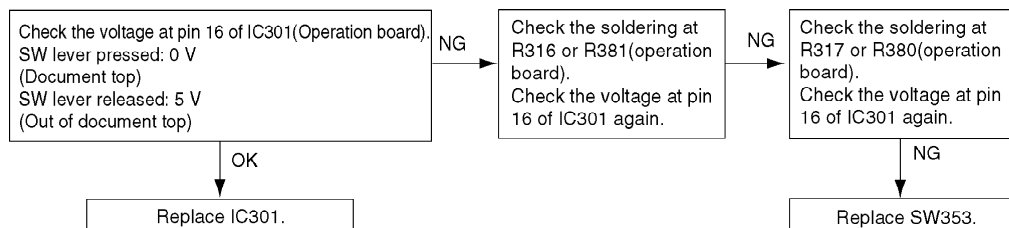
TEST FUNCTIONS()

2.3.12. SENSOR SECTION

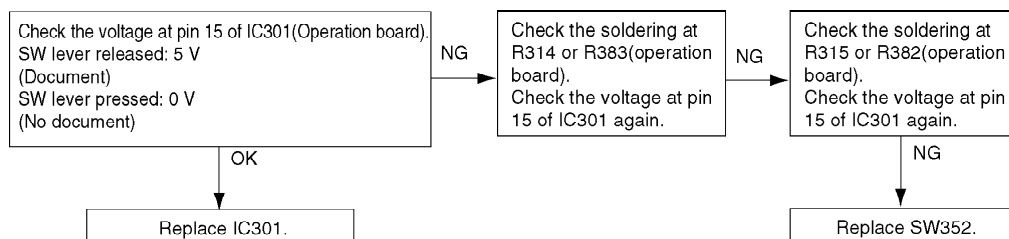
Refer to **SENSORS AND SWITCHES()** for the circuit descriptions.

The Test Function makes the sensor circuit check easier. (Refer to **TEST FUNCTIONS()**.) / For example, as for "COVER OPEN SENSOR", "CO" is turned ON/OFF on the display when you open or close the front cover. Also, document sensor, read position sensor, recording paper sensor and jam sensor are turned ON/OFF by the copy operation. Therefore, each sensor can be checked for proper mechanical operation. / As for the electric check, check whether each voltage is right or not with following flowchart turning each sensor lever ON/OFF manually.

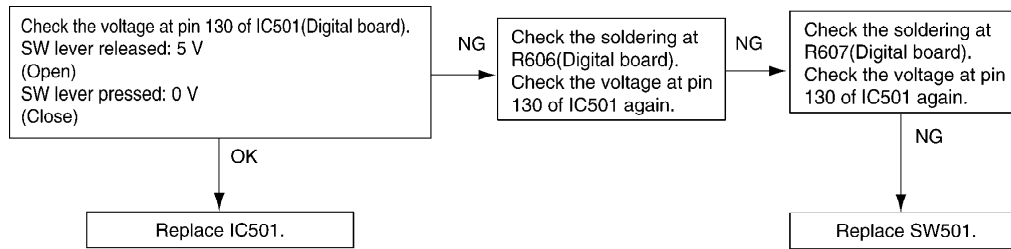
2.3.12.1. CHECK THE DOCUMENT TOP SW (SW353)....."REMOVE DOCUMENT"



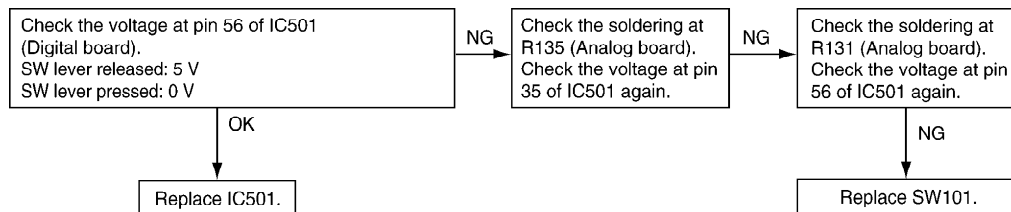
2.3.12.2. CHECK THE DOCUMENT SET SW (SW352)....."CHECK DOCUMENT"



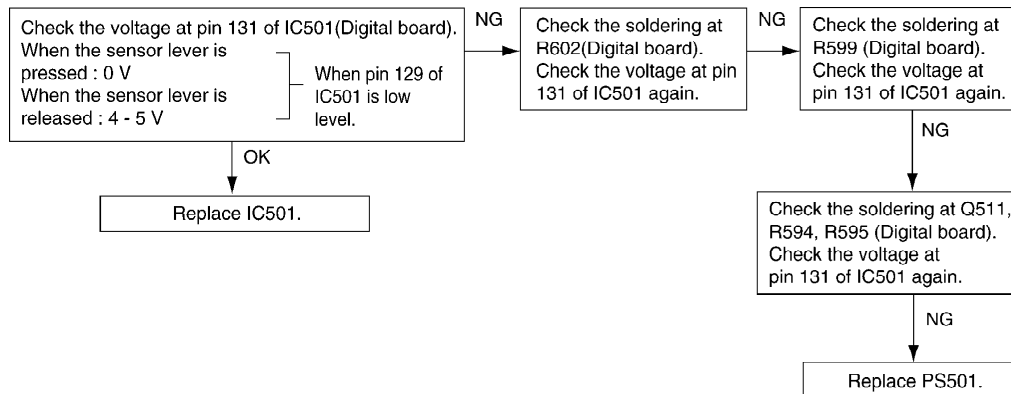
2.3.12.3. CHECK THE COVER OPEN AND THE FILM END SW (SW501)....."COVER OPEN " or "CHECK FILM"



2.3.12.4. CHECK THE HOOK SWITCH (SW101)

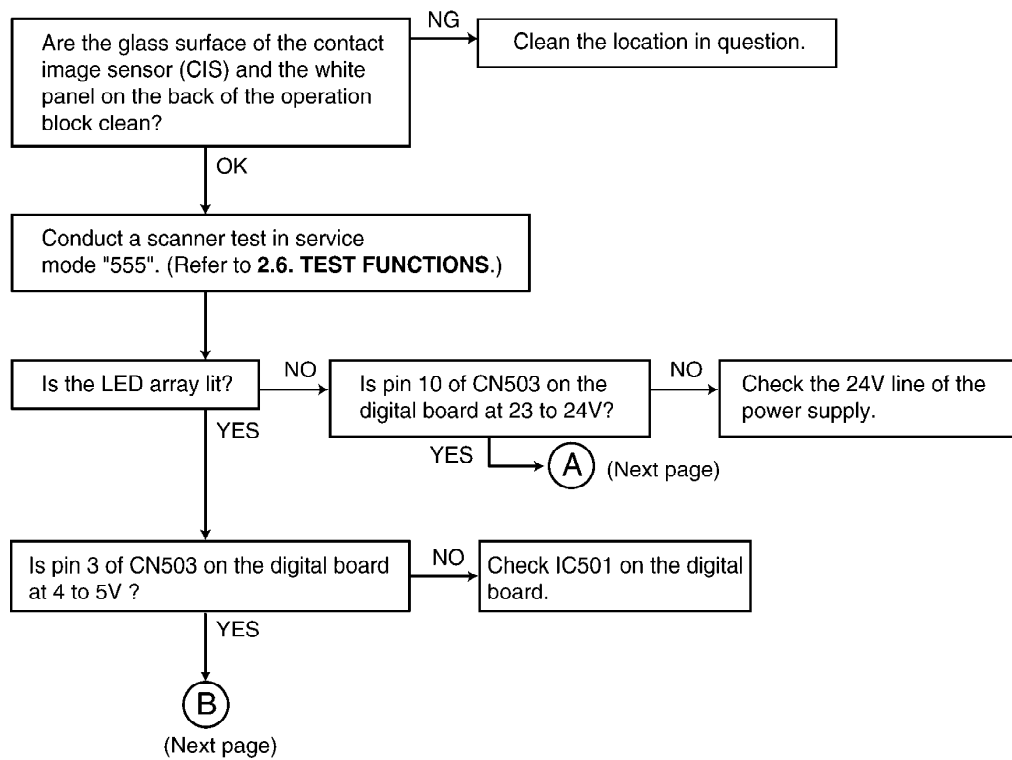


2.3.12.5. CHECK THE PAPER TOP SENSER (PS501)....."PAPER JAMMED"

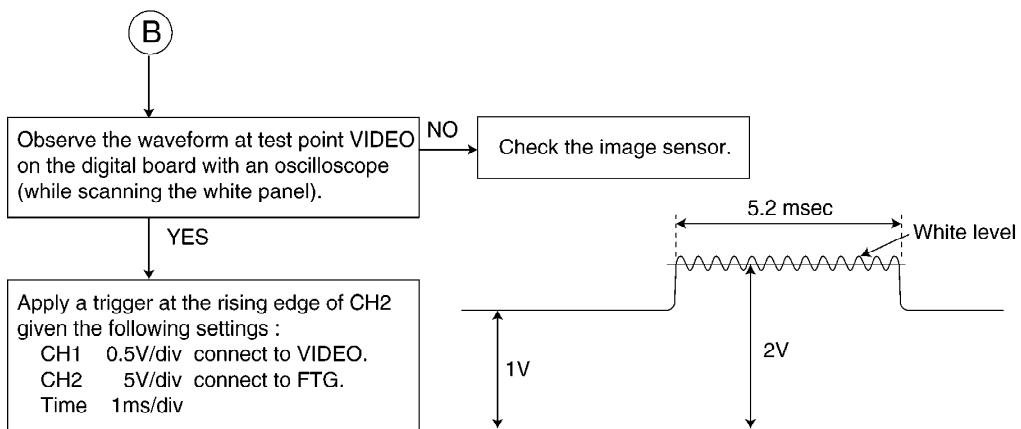
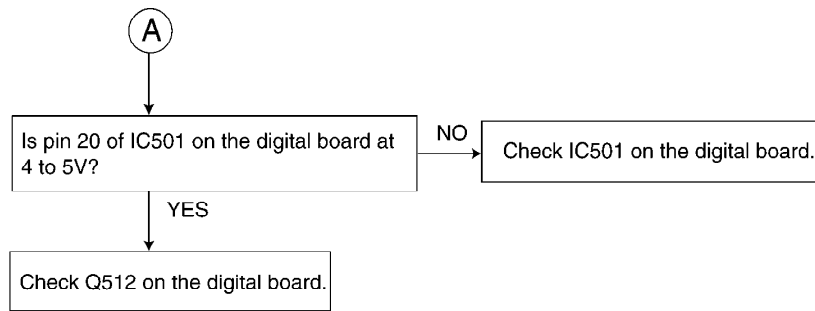


2.3.13. CIS (Contact Image Sensor) SECTION

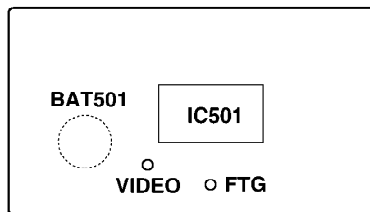
Refer to **SCANNING BLOCK()**.



CROSS REFERENCE:
TEST FUNCTIONS()

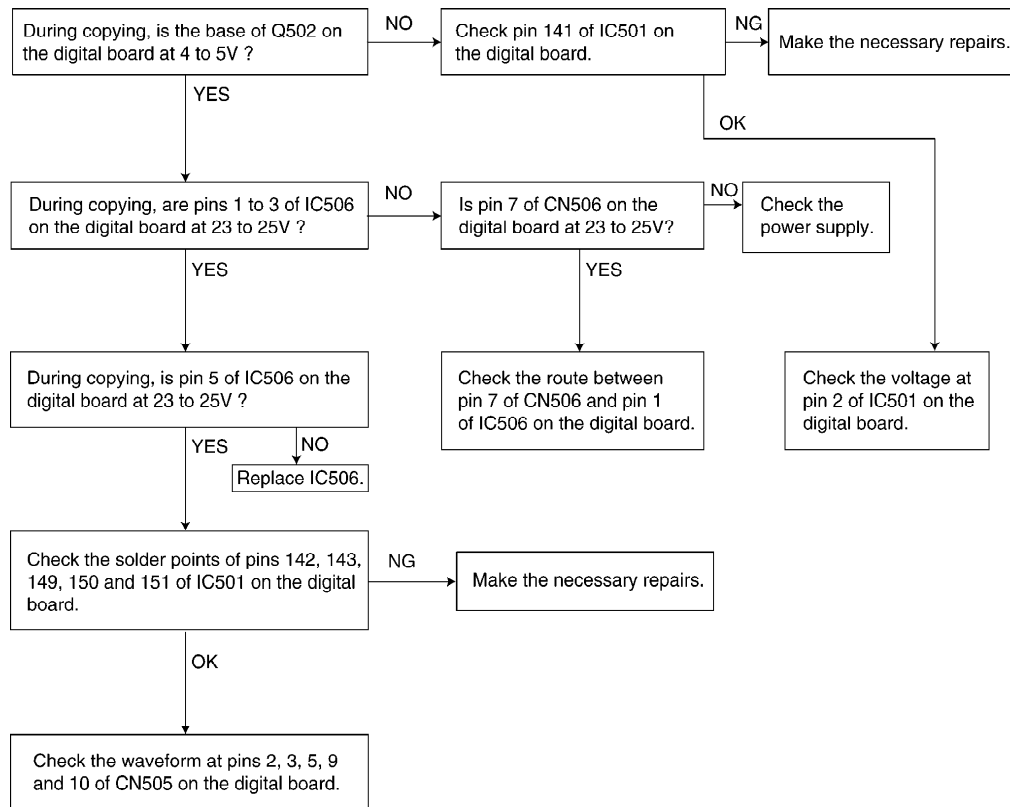


Digital Board
(Component View)



2.3.14. THERMAL HEAD SECTION

Refer to **THERMAL HEAD()**.



2.4. PANA LINK

2.4.1. INSTALLING PANA LINK SOFTWARE

1. Start Windows 95 / 98 / ME and close all applications.

2. Insert the included CD-ROM into your CD-ROM drive.

- The [Choose Setup Language] dialog box will appear.
Select the disired language that you want to use with this software from the drop-down list. Click [OK].
- If the [Choose Setup Language] dialog box does not appear:
The installation will automatically start.
- If the installation does not start automatically:
Click [Start]. Choose [Run...]. Type “d:\setup” (where “d:” is the drive letter of your CD-ROM drive). Click [OK].
(If your are not sure what the drive letter is for your CD-ROM drive, please use Windows Explorer and look for the CD-ROM drive.)
The installation will start.

3. Follow the instructions on the screen until all files have been installed.

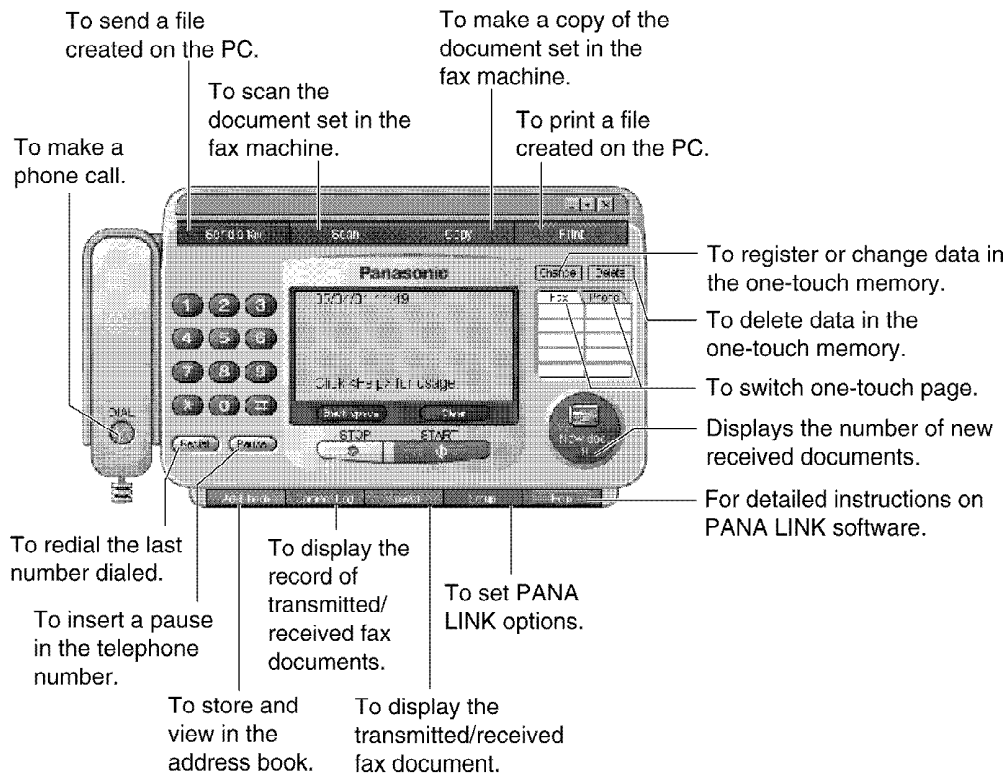
4. Be sure to read the [Readme] file for more information.

2.4.2. ACTIVATING PANA LINK SOFTWARE

1. Click [Start] in Windows.

2. Point to [Programs], point to [PANA LINK] and click [PANA LINK].

- The main panel will appear.



Note:

- The screens shown in these instruction are from Windows 95.
- The screens may differ slightly from those of the actual product.
- The screens are subject to change for improvement without notice.

2.4.3. LIST OF PANA LINK AND HELP INSTRUCTIONS

To obtain information about the PANA LINK application, use the help function.

For help, follow these steps.

For Windows 95/98/ME Users:

- 1. Click the Start button.**
- 2. Click Programs.**
- 3. Click PANA LINK.**
- 4. Click PANA LINK HELP.**

5. Click index or Contents and choose the subject you need help with.

[FUNCTIONS OF THE PANA LINK APPLICATION]

Applications	Functions
PANA LINK	Introduction
	Hardware requirements for PANA LINK
	About Install/Uninstall
	PANA LINK
	How to Start and Exit PANA LINK
	About the PANA LINK Main Panel
	A List of the Shortcut Keys
PRINT	Printing from a file
	Checking the printing status
transmit the faxsimile from the personal	About the Send a Fax panel
	Transmit an image file
	How to send a fax from a printed page
	Cover page
	Save and printing of the transmission data
	How to make a peculiar transmission
	Quick transmission
	Sending to several people in one operation (Broadcast)
	Sending at a certain time
	Sending several documents together
	The Advanced dialog
receive a faxsimile with the personal	Receiving a facsimile
	New fax notification
	How to make a peculiar transmission
	Forward the received facsimile automatically
	Forward the received facsimile as an e-mail message
	Stamp the received date (Time/Date stamp)
make a phone call	Make a phone call
	How to set the telephone number
	Dialing the telephone number manually
	Dial using the One-Touch keys
	Dial using the Address Book
	Dial the same person again
scan	How to scan
	Enlarge and reduce
	Image quality
	Intensity

Applications	Functions
copy	How to copy
Communication Log	About the Communication Log
	About the Sent Log
	About the Receiving Log
	About the Outbox
	Save the log
	Print the log
	Display the image of the facsimile document
	Send the log as an e-mail message
	Resend
	Change the destination of an unsent fax
	Forward
	Delete
	Change a log subject
	Find
	About the Find dialog box
	Sort
	Menu list

Applications	Functions
Address Book	About Address Book
	How to edit the data of the partners
	How to add a new entry
	How to update
	How to delete
	How to edit the Address Book
	How to create a new Address Book
	How to change the name of the Address Book
	How to delete an Address Book
	How to change the Address Book
	How to edit the distribution group
	How to create a group
	How to change the group name
	How to delete a group
	How to add members to a group
	How to change groups
	How to select the number
	Sending a phone or fax number from the Address Book to the LINK Main Panel
	How to move and copy
	Move and copy
	Other functions
	Find
	Sorting
	Simple print of the Address Book
	Print the Address Book in detail form
	Import and export the Address Book
	Save the Address Book
	Menu list
	Shortcut keys
Viewer	About the Viewer
Setup	Setup
	Line setup
	Transmit setup
	Reception setup
	System setup
	User Information
	Cover Page
One-Touch	One-touch keys
	How to register and change an entry
	How to delete an entry
	How to switch between fax and phone numbers
	How to select a number

Applications	Functions
Troubleshooting	Common problems
	Problems with transmission
	Problems with reception
	Problems with scan and copy
	Problems with connection
	Problems about the display of errors

2.4.4. PROBLEMS WITH PC SOFTWARE

2.4.4.1. GENERAL

PROBLEM	CAUSE & REMEDY
I cannot open a TIFF file.	<p>● You must change the compression format of the file. For example, to convert an image using WANG Imaging, proceed as follows</p> <ol style="list-style-type: none"> 1. Click on [Start], point to [Programs] -- [Accessories], then click [Imaging]. 2. Open the TIFF file that you cannot open in [Viewer] of PANA LINK. 3. Open the [Page] menu, and click [Convert]. <p>--The [Convert] dialogue box appears.</p> <ol style="list-style-type: none"> 4. Click the [Compression] tab, then choose [CCITT Group 3 (1d) Modified Huffman] from Compression drop-down list. 5. Click [OK]. <p>--The file's compression format is changed.</p>
I cannot send a fax from the PC at the specified time.	● The date and time of the PC may be set incorrectly. Adjust the date and time of the PC. If the date and time cannot be set correctly, consult your PC supplier.
The date and time that prints on the top of each page sent from the PC is incorrect.	● The date and time of the PC may be set incorrectly. Adjust the date and time of the PC. If the date and time cannot be set correctly, consult your PC supplier.
I do not know how to move the PANA LINK main panel, because there is no title bar.	● Point to an area with no buttons and drag to the desired spot.
I do not know whether the PANA LINK main panel is active or not.	<p>● The brightness of the main panel display shows you whether the PANA LINK main panel is active.</p> <p><Active -- bright, Non active -- dark></p>
A quick tip does not appear when I hold the mouse pointer over a button in the PANA LINK main panel, although I have set to display this.	● If the PANA LINK main panel is non-active, the quick tip does not appear. Confirm again after making the PANA LINK main panel active by clicking anywhere on it.
The telephone number set in the main panel display disappears, and the display shows [For storing a phone or fax number.] explanation of the button and so on.	● The quick tip is displayed. Move the mouse cursor out of the PANA LINK main panel. If you do not need quick tips, open the [Setup] dialogue and select [OFF] of [Quick Tip] in [System] tab.
The PANA LINK main panel disappears.	<p>● Look in the task tray (in the task bar). If you do not find the PANA LINK icon, it is closed. If you find the icon, the PANA LINK main panel is just minimised or reduced to an icon. / Double-click the icon in the task tray or open the menu by right-clicking the fax icon and select [Restore].</p>

PROBLEM	CAUSE & REMEDY
PANA LINK main panel disappears just after initialising.	● The PANA LINK main panel is set to minimise when PANA LINK starts. Double-click the icon in the task tray or open the menu clicking the fax icon, and select [Restore]. / If you do not want happen each time you start PANA LINK, click the [Setup] in the PANA LINK main panel, and leave the [Start minimized] check box blank in the [Program start-up settings] in [System] tab.
I want to delete all of the telephone numbers set in the main panel display.	● Press [STOP] button.
I cannot recognize the last part of the entry in the address list of the [Address Book] or [Communication Log].	● Put the cursor on the line between the buttons, the cursor changes to a double-headed arrow shape and you can expand the area by dragging, or double-click the entry.
I do not want to send a cover page with every fax.	● The setting of the cover page is [ON]. To deactivate the setting, open [Setup] dialogue by clicking on the [Setup] in the main panel, and check [Default Add Cover Page at every Transmission] in [Cover Page] tab.
I want to select a telephone number from [Address Book] onto the PANA LINK main panel, but I selected a fax number by mistake.	● You can change your selection in the PANA LINK main panel. Double click on the number in the main panel display until the telephone number appears. You can also right-click the entry to select a specific number.
I cannot use the [DIAL] button, even though I specified a telephone number.	● If there is transmission data or a document is set in the fax machine, you can only use the fax transmission function. If you want to make a phone call, delete the transmission data.
When I exit PANA LINK, the [Viewer] does not close.	● [Viewer] can be operated separately, so when PANA LINK is closed, it remains open.
PANA LINK does not work properly.	● Click the button to exit PANA LINK, and restart. If PANA LINK does not close, press the [Ctrl+Alt+Delete].

2.4.4.2. PRINTING

PROBLEM	CAUSE & REMEDY
I cannot print.	<p>● Please verify the following.</p> <ol style="list-style-type: none"> 1. Driver settings: If you change the driver settings in the Panasonic PANA LINK-S PRINT dialog box, you may be able to print. 2. Preview window: If the image is not properly displayed in the Preview window, your file may contain errors. Try printing a different file. Also, there may be a problem with the application you are using. 3. Bad connection between PC and printer: Verify the printer is properly connected and plugged in. 4. Re-install: Uninstall PANA LINK, reboot your PC, then re-install it. 5. Port setting: If the printer port is not set properly, you cannot print. <ol style="list-style-type: none"> A. Click the Start button, point to Settings then Printer. B. Choose Properties from the printer's pop-up menu. / --The Properties dialogue box appears. C. Click the Details tab, and check the Print to the following port drop down list box. If a different port is selected, Choose the serial port COM1-COM4 connected with the fax machine in the list. D. Click the Print the using the following driver drop down list box. / If PANA LINK-S PRINT is not selected, re-select it. E. Click the Port setting button. / - Set each parameter as follows: / - Bits per second: 19200 / - Parity: None / - Stop bits: 1 / - Flow control: Hardware F. Click the OK button. G. Click the OK button.

2.4.4.3. TRANSMISSION

PROBLEM	CAUSE & REMEDY
[Sending a fax failed.] message is displayed.	<ul style="list-style-type: none"> ● Possible causes are as follows. / --- Telephone circuit is good. --- You received a call-waiting signal. / --- The other party stopped reception. / --- The other party ran out of record paper. / Transmit again after checking with the other party.
[No response] message is displayed.	<ul style="list-style-type: none"> ● The other party did not answer the call or the line was busy. / Transmit again after waiting a while. ● The dialing mode setting (tone or pulse) is not correct. / Open the [Setup] dialogue box and check the dialing mode setting check box in [Line] tab.
I cannot make an international transmission.	<ul style="list-style-type: none"> ● Set the fax machine to the overseas transmission mode according to the operating instructions.
The length of the transmitted image differs slightly from the original.	<ul style="list-style-type: none"> ● Set the [Resolution] to [Fine] (200 x 200dpi) and transmit again.

2.4.4.4. RECEPTION

PROBLEM	CAUSE & REMEDY
The fax machine receives a fax, but I want to receive it on the PC.	<ul style="list-style-type: none"> ● You may have checked [Receive directly to facsimile unit] in the [Reception] tab in the [Setup] dialogue box. If so, click the check box to deactivate. ● The setting of the PC LINK on the fax machine is off. / Turn it on. ● The PANA LINK application is not operating. Start the PANA LINK application.
The PC receives a fax, but I want to receive it on the fax machine.	<ul style="list-style-type: none"> ● Open the [Setup] dialogue box, and check [Receive directly to facsimile unit] in the [Reception] tab.
I want to print out the received fax with another printer.	<ul style="list-style-type: none"> ● Print after selecting the desired printer from the [Printer] dialogue box.
[Receiving a fax failed.] message is displayed.	<ul style="list-style-type: none"> ● Possible causes are as follows. / --- The line condition is not good. / --- The reception was interrupted by a call waiting signal. / Check with the other party and try again.



2.4.4.5. SCAN AND COPY

PROBLEM	CAUSE & REMEDY
I cannot scan.	<ul style="list-style-type: none"> ● The fax machine may be in use. Try again after the operation is completed. ● There may not be enough space on the hard disk. Try after deleting unnecessary files or closing unused applications. ● There might not be enough RAM. Try again after closing some applications. / Restart the PC, and try again.
The document is not pulled into the document feeder.	<ul style="list-style-type: none"> ● Confirm that a maximum of 10 pages are set correctly.
A document is jammed.	<ul style="list-style-type: none"> ● You attempted to transmit a document longer than 600mm. Remove the jammed document and try again.
The recording paper is jammed.	<ul style="list-style-type: none"> ● Remove the jammed recording paper, reinsert it, and try again.
Even after clicking [Stop], scanning continues.	<ul style="list-style-type: none"> ● Please wait. It may take a while for the cancel request to be accepted.

2.4.4.6. ERROR MESSAGE

PROBLEM	CAUSE & REMEDY
[Initialization failed.] is displayed.	<ul style="list-style-type: none"> ● Check the connection of the PC and the fax machine. ● The setting of the PC LINK on the fax machine is off. Turn it on.

2.4.4.7. PRINT QUALITY

PROBLEM	CAUSE & REMEDY
The printing quality is poor.	<ul style="list-style-type: none"> ● Some paper has instructions recommending which side to print on. Try turning the paper over.
The printing is faint. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> Original  </div> <div style="text-align: center;"> Copy  </div> </div>	<ul style="list-style-type: none"> ● You may have used paper with a cotton and/or fiber content that is over 20%, such as letterhead or resume paper.
A dirty pattern or a black line appears on the printouts.	<ul style="list-style-type: none"> ● The glass or rollers are dirty. Clean them. See the operation instructions.

2.5. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the machine, and to test the machine.

This facilitates communication between the user and the service man while programming the unit.

SETUP LIST

[BASIC FEATURE LIST]

NO.	FEATURE	CURRENT SETTING
#01	SET DATE & TIME	Jan. 01 2001 12:00AM
#02	YOUR LOGO	
#03	YOUR FAX NUMBER	
Code → #04	PRINT SENDING REPORT	ERROR [ERROR,ON,OFF]
#06	TAD/FAX RING COUNT	1 [1...4,TOLL SAVER,RINGER OFF]
#10	RECORDING TIME	VOX [VOX,1MIN]
#11	REMOTE TAD ID	ID = 111
#13	DIALING MODE	1 [TONE,PULSE]
#14	PC LINK	ON [ON,OFF]
#16	PAPER SIZE	A4 [A4,LETTER]

Set Value

[ADVANCED FEATURE LIST]

NO.	FEATURE	CURRENT SETTING
#22	JOURNAL AUTO PRINT	ON [ON,OFF]
Code → #23	OVERSEAS MODE	OFF [ON,OFF]
#25	DELAYED TRANSMISSION	OFF [ON,OFF]
	DESTINATION =	
	START TIME = 12:00AM	
#30	SILENT FAX RECOGNITION RING	3 [3...6]
#31	RING DETECTION	OFF [OFF,A,B,C,D]
#36	RCV REDUCTION	92% [72,86,92,100]
#39	LCD CONTRAST	NORMAL [NORMAL,DARKER]
#41	FAX ACTIVATION CODE	ON [ON,OFF]
	CODE = *9	
#42	MESSAGE ALERT	OFF [ON,OFF]
#43	RECORDING TIME ALERT	OFF [ON,OFF]
#44	MEMORY RECEIVE ALERT	ON [ON,OFF]
#46	FRIENDLY RECEPTION	ON [ON,OFF]
#47	FAX VOICE GUIDANCE	ON [ERROR,ON,OFF]
#54	GREETING MSG. RECORDING TIME	16s [16s,60s]
NOTE : If you change from 60sec. to 16sec. your-greeting will be erased and your new greeting will be limited to 16 seconds.		
#58	ORIGINAL SETTING	NORMAL [NORMAL,LIGHT,DARKER]
#60	MESSAGE TRANSFER	OFF [ON,OFF]
	DESTINATION =	
#61	TRANSFER GREETING	CHECK [CHECK,RECORD,ERASE]
#67	ICM MONITOR	ON [ON,OFF]
#68	ECM SELECTION	ON [ON,OFF]
NOTE : You cannot change the setting of this feature, if there are stored documents in memory.		
#70	PAGER CALL	OFF [ON,OFF]
	DESTINATION =	
#76	CONNECTING TONE	ON [ON,OFF]
#77	AUTO ANSWER MODE	TAD/FAX [TAD/FAX,FAX ONLY,TEL/FAX]
#78	TEL/FAX DELAYED RING	1 [1...4]
#80	SET DEFAULT (EXCEPT #68)	

Set Value

Note:

The above values are the default values.

2.5.4. SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 msec	001~600	50	-----
502	Flash time	X 10 ms	01~99	70	-----
503	Dial speed select	1:10 pps 2: 20 pps	1, 2	1	-----
510	VOX time	1:8 sec 2: 6sec 3: 4sec	1~3	2	-----
511	VOX sense	1:High 2: Low	1, 2	1	When the TAM (or EXT TAM) does not stop recording the ICM because noise is detected on the telephone line, change this setting to "Low".
512	VOX mode (KX-FM89CX only)	1:A 2:B	1, 2	A	-----
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See Symptom/Countermeasure for long distance and international calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS (p. 10).
521	International mode select	1:ON 2: OFF	1, 2	1	See Symptom/Countermeasure for long distance and international calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS (p. 10).
522	Auto standby select	1:ON 2: OFF	1, 2	1	The resolution reverts to the original setting when transmission is completed.
523	Receive equalizer select	1:0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is far from the unit or reception cannot be performed correctly, adjust accordingly.
524	Transmission equalizer select	1:0 km 2: 1.8 km 3: 3.6 km 4: 7.2 km	1~4	1	When the telephone station is far from the unit or transmission cannot be performed correctly, adjust accordingly.
533	Setting the number of times that message transfer is redialed.	00~99	00~99	03	Selects the number of times that message transfer is redialed (including the first dialing).
534	Setting the message transfer/pager call redial interval	001~999 sec	001~999	065	Sets the interval of message transfer/pager call redial.
550	Memory clear: To reset the value to the default one, except the top margin (853) and left margin (854).				"START" input

Code	Function	Set Value	Effective Range	Default	Remarks
551	ROM check				See TEST FUNCTIONS() .
552	DTMF single tone test	1:ON 2: OFF	1, 2	2	See TEST FUNCTIONS() .
553	Monitor on FAX communication select	1:OFF 2: PHASE B 3: ALL	1~3	1	Sets whether to monitor the li signal with the unit's speaker FAX communication or not.
554	Modem test				See TEST FUNCTIONS() .
555	Scan check				See TEST FUNCTIONS() .
556	Motor test			0	See TEST FUNCTIONS() .
557	LED test				See TEST FUNCTIONS() .
558	LCD test				See TEST FUNCTIONS() .
559	Document jam detection select	1:ON 2: OFF	1, 2	1	See DOCUMENT JAMS-SEND
561	KEY test				See TEST FUNCTIONS() .
570	BREAK % select	1:61% 2: 67%	1, 2	1	Sets the % break of pulse dial according PBX.
571	ITS auto redial time set	X number of times	00~99	05	Selects the number of times t is redialed (not including the 1 dial).
572	ITS auto redial line disconnection time set	X second	001~999	065	Sets the interval of ITS rediali
573	Remote turn-on ring number set	X number of rings	01~99	15	Sets the number of rings befo unit starts to receive a docum the TEL mode.
580	TAM continuous tone detection	1:ON 2: OFF	1, 2	1	ON : Stops TAM operation wh tone, etc. are detected.
590	FAX auto redial time set	X number of times	00~99	05	Selects the number of redial t during FAX communication (r including the first dial).
591	FAX auto redial time disconnection time set	X second	001~999	065	Sets the FAX redial interval di FAX communication.
592	CNG transmit select	1:OFF / 2: ALL / 3: AUTO	1~3	2	Lets you select the CNG outpu during FAX transmission. ALL is output at phase A. AUTO: C output only when automatic d is performed. OFF: CNG id no at phase A. Refer to SOMETIN THERE IS A TRANSMIT PROE

Code	Function	Set Value	Effective Range	Default	Remarks
593	Time between CED and 300bps	1:75 msec / 2:500 msec / 3:1 sec	1~3	1	See Symptom/Countermeasure for long distance and international calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS () . Refer to RECEIVE PROBLEM THE UNIT CAN COPY, BUT CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS () .
594	Overseas DIS detection select	1: detects at the 1st time / 2: detects at the 2nd time	1, 2	1	See Symptom/Countermeasure for long distance and international calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS () . Refer to SOMETIME THERE IS TRANSMIT PROBLEM () and THE UNIT CAN COPY, BUT CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS () .
595	Receive error limit value set	X Number of times	001~999	100	Sets the number of acceptable lines when the FAX reconstruction received data. Refer to RECEIVE PROBLEM () .
596	Transmit level set	X dBm	- 15~00	10	Selects the FAX transmission level. Refer to SOMETIME THERE IS TRANSMIT PROBLEM () and RECEIVE PROBLEM () .
598	Receiving sensitivity	43~ -43 dBm	20~48	40	Used when there is an error in reception. Refer to THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONAL COMMUNICATIONS () .
599	ECM frame size	1:256 2:64	1, 2	1	-----
624	AT ring time out	1:3 sec 2:5 sec	1, 2	1	-----

Code	Function	Set Value	Effective Range	Default	Remarks
717	Transmit speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS / 4: 7200BPS / 5: 4800BPS / 6: 2400BPS	1~6	1	Adjusts the speed to start transmission during FAX transmission. Ref SOMETIME THERE IS A TRANSMISSION PROBLEM () and THE UNIT CANNOT COPY, BUT THE TRANSMISSION AND RECEPTION IMAGE ARE INCORRECT () .
718	Receive speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS / 4: 7200BPS / 5: 4800BPS / 6: 2400BPS	1~6	1	Adjusts the speed to start transmission during FAX reception. Refer to RECEIVE PROBLEM () and THE UNIT CANNOT COPY, BUT THE TRANSMISSION AND RECEPTION IMAGE ARE INCORRECT () .
719	Ringer off in TEL/FAX mode	1: ON 2: OFF	1, 2	1	Selects the ringer switch off when a call is received in the TEL/FAX mode.
721	Pause tone detect	1: ON 2: OFF	1, 2	1	Selects the tone detection for pause in dialing.
722	Redial tone detect	1: ON 2: OFF	1, 2	1	Sets the tone detection mode for redialing.
724	PC-FAX ATD busy tone detect	1: ON 2: OFF	1, 2	2	-----
731	CPC mode	1: A 2: B 3: OFF	1~3	1	Sets the CPC signal detection mode from the converter.
732	AUTO disconnect cancel time	1: 350 ms 2: 1.8 sec 3: OFF	1~3	1	“Set to “2” when the auto disconnect circuit operates and cuts the line.”
745	Power ON film feed	1: ON 2: OFF	1, 2	1	When the power is turned on, the film is wound to take up any slack.
763	CNG detect time for friendly reception	1: 10 sec / 2: 20 sec / 3: 30 sec	1~3	3	Selects the CNG detection time for friendly reception.
771	T1 timer	1: 35 sec / 2: 60 sec	1, 2	1	Sets a higher value when the response from the other party is delayed more time during FAX transmission.
774	T4 timer	X 100 msec	00~99	0	Use this function when delay in the line and communication (Mobile comm) does not work.

Code	Function	Set Value	Effective Range	Default	Remarks
775	Monitoring of message transfer	1:ON 2:OFF	1, 2	2	If set to ON a message can be monitored from this unit's SP PHONE when transferring a message.
784	Voice prompt test				You can hear the voice prompt speaker after pressing "STAR".
815	Sensor & Vox check				See TEST FUNCTIONS() .
841	Digital SP-phone check				See DIGITAL SPEAKERPHONE() .
852	Print test pattern				See TEST FUNCTIONS() .
853	Top margin		1~9	5	-----
854	Left margin		1~8	5	-----
870	Serial port self test				-----
880	History list				See HISTORY() .
881	Journal 2 list				See PRINTOUT EXAMPLE() .
882	Journal 3 list				See PRINTOUT EXAMPLE() .
890	TEL/FAX 1st ring back tone	1:ON 2:OFF	1, 2	1	Selects whether the TEL/FAX back tone is ON or OFF in the FAX mode.
895	TEL/FAX mode receiving mode setting after bell time out	1:TAD 2:FAX	1, 2	2	FAX or TAD can be performed in FAX mode after the bell time has run out.

2.5.5. SERVICE MODE SETTINGS (Example of a printed out list)

```

      【 SERVICE DATA LIST 】
      Code 501 PAUSE TIME      = 050*100ms      [001...600]*100ms
           502 FLASH TIME     = 70*10ms       [01...99]*10ms
           503 DIAL SPEED      = 10pps         [1=10 2=20]pps
           510 VOX TIME        = 6sec          [1=8 2=6 3=4]sec
           520 CED FREQ.       = 2100Hz        [1=2100 2=1100]Hz
           521 INTL. MODE      = ON            [1=ON 2=OFF]
           522 AUTO STANDBY    = ON            [1=ON 2=OFF]
           523 RX EQL.         = 0.0Km         [1=0.0 2=1.8 3=3.6 4=7.2]Km
           524 TX EQL.         = 0.0Km         [1=0.0 2=1.8 3=3.6 4=7.2]Km
           853 TOP MARGIN      = 5             [1...9]
           854 LEFT MARGIN     = 5             [1...8]

      【 SPECIAL SERVICE SETTINGS 】
      Code 511 533 534 552 553 559 570 571 572 573 580 590 591
           1 03 065 2 1 1 1 05 065 15 1 05 065
           Set Value
           592 593 594 595 596 598 599 624 717 718 719 721 722
           2 1 1 100 10 40 1 1 1 1 1 1 1
           724 731 732 745 763 771 774 775 890 895
           2 1 1 1 3 1 00 2 1 2

      USAGE TIME = 00000 HOURS

```

Note:

The above values are the default values.

2.5.6. HISTORY

【 HISTORY 】

```

[ E 5 7 1 B B ] — (1)    [ B 7 4 3 ] — (2)
[ N O N E ] — (3)
[ N O N E ] — (4)
[ N O N E ] — (5)

(6) — [ 0 0 0 0 ] [ 0 1 ] — (7) [ 0 1 ] — (8) [ 2 0 0 0 ] — (9)    [ 0 0 0 0 ] — (10)
(11) — [ 0 0 0 0 2 ] [ 0 0 0 0 0 ] — (12)    [ 0 0 0 0 0 ] — (13)    [ 0 0 0 0 2 ] — (14)
(13) — [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] [ 0 0 0 0 2 ] — (15)    [ T A D / F A X ] — (16)
Factory use only [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] T O N E — (17) 9 2 % — (18)    [ 0 0 0 0 0 ] — (19)
(21) — [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] [ 0 0 0 0 1 ] N O N E — (20)    [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] — (21)
(23) — [ N O N E ] [ N O N E ] — (22) [ N O N E ] — (23) [ N O N E ] — (24)
(30) — [ 0 0 2 ] (31) — [ 0 0 0 ] (32) — [ 0 0 0 0 0 ] N O N E — (25)    (34) — [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] — (26)
(36) — [ 0 0 0 0 0 ] [ 0 0 0 0 1 ] [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] — (27)    (40) — [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] — (28)
(42) — [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] [ 0 0 0 0 0 ] — (29)    [ 0 0 0 0 0 ] — (29)

```

NAME _____ DATE _____ DEALER _____ FILM _____

CUSTOMER COMPLAINT _____

SURVEY RESULT : CKOK (UNKNOWN/DESIGN/EDUC) DEFECT (PART/WORKER/DESIGN)
 ABUSE (CUST/DEALER/SHIP) NEW (OPEN/NOT)
 PHONE SURVEY RESULT.

Note:

See the following descriptions of this report. Item No. (1) ~ (49) are corresponding to the listed items in **DESCRIPTIONS OF THE HISTORY REPORT()**.

2.5.6.1. DESCRIPTIONS OF THE HISTORY REPORT

(1) ROM VERSION

EPROM version

(2) SUM

EPROM internal data calculation.

(3) YOUR LOGO

The user logo recorded in the unit. If it is not recorded, NONE will be displayed.

(4) YOUR TELEPHONE NUMBER

The user telephone number recorded in the unit. If it is not recorded, NONE will be displayed.

(5) FAX PAGER NUMBER

If you program a pager number into the unit, the pager number will be displayed here.

(6) FACTORY - CUSTOMER

This shows how many days from factory production until the user turns ON the unit.

(7) MONTH

The shows the very first month, date, year and time set by the user after they purchased the unit.

(8) DAY

The shows the very first month, date, year and time set by the user after they purchased the unit.

(9) YEAR

The shows the very first month, date, year and time set by the user after they purchased the unit.

(10) TIME

The shows the very first month, date, year and time set by the user after they purchased the unit.

(11) USAGE TIME

The amount of time the unit has been powered ON.

(12) FACTORY - NOW

This shows how many days from factory production until the user prints out this history list.

(13) TEL MODE

The amount of time the TEL mode setting was used.

(14) FAX MODE

The amount of time the FAX mode setting was used.

(15) TEL/FAX MODE

The amount of time the TEL/FAX mode setting was used.

(16) ANS/FAX MODE

The amount of time the ANS/FAX mode setting was used.

(17) FINAL RECEIVE MODE

The last set receiving mode by the user.

(18) TONE/PULSE SELECTION

The most recently used setting used, either TONE or PULSE.

(19) RECEIVE REDUCTION

The compression rate when receiving.

(20) SETTING NO. OF DIRECTORY

The recorded directory stations (one touch and EASY DIAL).

(21) NUMBER OF COPY

The number of pages copied.

(22) NUMBER OF RECEIVE

The number of pages received.

(23) NUMBER OF SENDING

The number of pages sent.

(24) Not Used

(25) NUMBER OF RECORDING MESSAGE

The number of messages recorded in TAM.

(26) NUMBER OF PC SCAN

The number of times multifunction was used for the Scanner. (The number of pages scanned. If the unit does not have a PC interface, NONE will be printed.)

(27) NUMBER OF PC-PRINT

The number of times multifunction was used for the Printer. (The number of pages printed. If the unit does not have a PC interface, NONE will be printed.)

(28) NUMBER OF RECEIVING TO PC

The number of times received in the PC through the FAX serial interface (RS232C). (The number of pages received. If the unit does not have a PC interface, NONE will be printed.)

(29) NUMBER OF SENDING FROM PC

The number of times transmitted from the PC through the FAX serial interface (RS232C). (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(30) NUMBER OF PRINTING WARNING LIST

The number of warning lists printed until now.

(31) NUMBER OF PRINTING HELP

The number of help lists printed until now.

(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION

The number of faxes received that were divided into more than one sheet since the unit was purchased.

(33) DETECTION OF RS232C

When the fax and PC serial cable (RS232C) are connected and the signal is received correctly, COMPLETE will be printed. For models without a PC interface or when there is a PC interface but the signal cannot be received between the fax and PC, INCOMPLETE will be printed. (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(34) Not Used

(35) Not Used

(36) FAX MODE

Means the unit received a fax message in the FAX mode.

(37) MAN RCV

Means the unit received a fax message by manual operation.

(38) FRN RCV

Means the unit received a fax message by friendly signal detection.

(39) VOX

Means the unit detected silence or no voice.

(40) RMT DTMF

Means the unit detected DTMF (Remote Fax activation code) entered remotely.

(41) PAL DTMF

Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.

(42) TURN-ON

Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)

(43) TIME OUT

Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.

(44) IDENT

Means the unit detected Ring Detection.

(45) CNG OGM

Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode, or while answering a call in the EXT-TAM mode. Or means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.

(46) CNG ICM

Means the unit detected the CNG while it was recording the ICM in the ANS/FAX mode.

(47) Not Used

2.5.7. SPECIAL SERVICE JOURNAL REPORTS

Journal 2 and Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 881 or 882. Remote printing function for the journal reports (JOURNAL, JOURNAL 2 and JOURNAL 3) is also available for service technicians. (Refer to **REMOTE PROGRAMMING()**.) The JOURNAL

report only gives you basic information about a communication, but the other two journal reports provide different information on the same item (communication).

JOURNAL						
Mar. 23 2001 09:51AM						
YOUR LOGO :						
YOUR FAX NO:						
NO.	OTHER FACSIMILE	START TIME	USAGE TIME	MODE	PAGES	RESULT *CODE
01	3332222	Jan. 21 02:14PM	00'45	SND	01	OK
02	9998765	Jan. 21 03:17PM	00'58	SVD	02	OK
03	John	Jan. 21 05:18PM	00'48	RCV	01	OK
04	555556677	Jan. 22 10:35AM	02'45	RCV	03	COMMUNICATION ERROR (46)

JOURNAL 2					
Mar. 23 2000 09:51AM					
(4)					
NO.	(1) RCV. MODE	(2) SPEED (CNT.)	(3) RESOLUTION	(4) RCV-TRIG. (CNT.)	(5) ERROR->MEMORY
01	TEL	9600BPS	STD.		
02	TEL	9600BPS	FINE		
03	FAX ONLY	7200BPS	STD.	FAX MOD	
04	FAX ONLY	9600BPS	STD.	CNG (0003)	

JOURNAL 3					
Mar. 23 2000 09:51AM					
(9)					
NO.	(6) ENCODE	(7) MSLT	(8) EQM (RX)	(9) ERROR LINE (RX)	(10) MAKER CODE
01	MH	20msec	0000	00000	79
02	MH	20msec	0000	00000	00
03	MR	20msec	1200	00013	00
04	MR	20msec	0000	00000	00

HOW TO READ JOURNAL REPORTS:

Example:

1. Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 2 and the JOURNAL 3. You can get the following information.
 * MODE: Fax transmission / * RCV. MODE: TEL / * TX SPEED: 9.6 kbps / * RESOLUTION: standard / * ENCODE: MH / * MAKER CODE: 79
2. Look at NO. 04 in the JOURNAL 2. CNG (0003) indicates that the CNG signal has been received three times since the purchase date.

For further details, see [JOURNAL 2\(\)](#) and [JOURNAL 3\(\)](#).

2.5.7.1. JOURNAL 2

Refer to JOURNAL 2 in **PRINTOUT EXAMPLE()**.

Journal 2 displays the additional detailed information about the last 35 communications.

Descriptions:

(1) RCV. MODE

Indicates which receive mode the unit was in when the unit received a fax message.

This information is also displayed when the unit transmitted a fax message.

(2) SPEED

Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page's communication speed. If there is a communication error, "?" is displayed.

(3) RESOLUTION

Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page's resolution. If there is a communication error, "?" is displayed.

(4) RCV-TRIG. (CNT.)

Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 2 in **PRINTOUT EXAMPLE()**. The values in parentheses indicate how many times the trigger has been used. (For example, "0003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	FRN RCV	Means the unit received a fax message by friendly signal detection.
4	VOX	Means the unit detected silence or no voice.
5	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
6	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
7	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
8	TIME OUT	Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.
9	IDENT	Means the unit detected Ring Detection.
10	CNG OGM	Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode. / OR / Means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.
11	CNG ICM	Means the unit detected the CNG while it was recording the ICM in the ANS /FAX mode.

(5) ERROR → MEMORY

Indicates the reason why the unit received a fax message in memory.

If you look at No.11 in the JOURNAL 2 in **PRINTOUT EXAMPLE()**, it shows the fax message was received in memory due to "PAPER OUT" error.

[NO RESPONSE DISAPPEARED ON JOURNAL]

The "NO RESPONSE DISAPPEARED ON JOURNAL" displays the information about the last 10 communications terminated by "No Response". (Some of the communications terminated by "No Response" were not displayed in the JOURNAL.)

When a fax transmission cannot be performed because the other party's unit is set to the TEL mode, "No response" will be printed.

2.5.7.2. JOURNAL 3

Refer to JOURNAL 3 in **PRINTOUT EXAMPLE()**.

Descriptions:

(6) ENCODE

Compression Code: MH/MR/MMR

(7) MSLT

MSLT means Minimum Scan Line Time. Used only at the factory.

(8) EQM

EQM means Eye Quality Monitor. Used only at the factory.

(9) ERROR LINE(RX)

When an error occurs while receiving a fax, this shows the number of error lines.

(10) MAKER CODE

This shows a 2 digit code of the other party's fax machine brand.

0E: "KX" model

00: Unknown

79: "UF" model

19: "Xerox" model

2.5.7.3. PRINTOUT EXAMPLE

JOURNAL2

Mar. 25 2000 01:59PM

NO.	RCV. MODE	SPEED (CNT.)	RESOLUTION	RCV-TRIG. (CNT.)	ERROR->MEMORY
01	FAX ONLY	9600BPS	FINE.	FAX MOD	
02	FAX ONLY	9600BPS	STD.	FAX MOD	
03	FAX ONLY	9600BPS	FINE.		
04	FAX ONLY	9600BPS	FINE.	FAX MOD	
05	FAX ONLY	9600BPS	FINE.	FAX MOD	
06	FAX ONLY	9600BPS	FINE.	FAX MOD	
07	FAX ONLY	9600BPS	FINE.		
08	FAX ONLY	9600BPS	FINE.		
09	FAX ONLY	9600BPS	FINE.		
10	FAX ONLY	9600BPS	STD.	FAX MOD	
11	FAX ONLY	9600BPS	FINE.	FAX MOD	PAPER OUT
12	FAX ONLY	9600BPS	STD.	FAX MOD	
13	FAX ONLY	9600BPS	STD.		
14	FAX ONLY	?	?		
15	FAX ONLY	?	?		
16	FAX ONLY	?	?		
17	FAX ONLY	9600BPS	STD.		
18	FAX ONLY	9600BPS	FINE.	FAX MOD	
19	FAX ONLY	9600BPS	STD.	FAX MOD	
20	FAX ONLY	9600BPS	S-FINE.		
21	FAX ONLY	9600BPS	FINE.		
22	FAX ONLY	9600BPS	FINE.	FAX MOD	
23	FAX ONLY	?	?	FAX MOD	
24	FAX ONLY	9600BPS	STD.	FAX MOD	
25	FAX ONLY	9600BPS	STD.	FAX MOD	
26	FAX ONLY	9600BPS	FINE.	FAX MOD	
27	FAX ONLY	9600BPS	FINE.		
28	FAX ONLY	9600BPS	STD.	FAX MOD	
29	FAX ONLY	9600BPS	FINE.	FAX MOD	
30	FAX ONLY	9600BPS	S-FINE.	FAX MOD	
31	FAX ONLY	9600BPS	STD.	FAX MOD	
32	FAX ONLY	9600BPS	STD.	FAX MOD	
33	FAX ONLY	?	?	FAX MOD	
34	FAX ONLY	9600BPS	STD.	FAX MOD	
35	FAX ONLY	9600BPS	STD.	FAX MOD	

NO RESPONSE DISAPPEARED ON JOURNAL

NO.	START TIME	RCV. MODE	RCV-TRIG. (CNT.)
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JOURNAL3

Mar. 25 2000 01:58PM

NO.	ENCODE	MSLT	EOM(RX)	ERROR LINE(RX)	MAKER CODE
01	MR	10msec	007A	00000	0E
02	MR	20msec	016B	00000	00
03	MH	10msec	0000	00000	00
04	MR	20msec	019B	00003	00
05	MR	20msec	0156	00011	00
06	MR	20msec	0113	00000	00
07	MR	5msec	0000	00000	79
08	MR	5msec	0000	00000	79
09	MR	0msec	0000	00000	19
10	MR	20msec	0100	00000	00
11	MR	10msec	0073	00000	0E
12	MR	20msec	012B	00000	00
13	MH	20msec	0000	00000	79
14	MH	20msec	0000	00000	00
15	MH	20msec	0000	00000	00
16	MH	20msec	0000	00000	00
17	MR	5msec	0000	00000	79
18	MR	10msec	00AB	00004	0E
19	MR	20msec	0124	00000	00
20	MR	20msec	0000	00000	00
21	MR	20msec	0000	00000	00
22	MR	20msec	0135	00000	00
23	MR	20msec	0000	00000	00
24	MR	20msec	01BC	00000	00
25	MR	20msec	01AC	00000	00
26	MR	20msec	020F	00000	00
27	MR	10msec	0000	00000	0E
28	MR	20msec	01DF	00000	00
29	MR	20msec	01EA	00000	00
30	MR	20msec	00CD	00000	00
31	MR	20msec	02F8	00000	0E
32	MR	10msec	04F8	00000	0F
33	MR	10msec	0000	00000	00
34	MR	20msec	03B6	00000	0E
35	MH	20msec	00E0	00000	00

2.6. TEST FUNCTIONS

The codes listed below can be used to perform simple checks of some of the unit's functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test Mode	Type of Mode	Code	Function
		Operation after code input	
MOTOR TEST	Service Mode	"5" "5" "6"	Rotates the transmission and reception motor to operation of the motor. 13: FAX TX / Reading memory 14: Document feed 23: Recording paper is fed 33: List / FAX RX print, pull back recording paper 43: Copy 05: Recording paper feed (Test a recording paper feeding operation by shift 23 to 33). Press STOP button to quit.
		START	
MODEM TEST	Service Mode	"5" "5" "4"	Telephone line circuit is connected automatically, the following signals on the circuit line. 1) OFF 2)14400bps 3)12000bps 4) 9600bps(U17) 5)7200bps(U17) 6)9600bps 7)7200bps 8) 4800bps 9)2400bps 10) 300bps 11) 2100Hz 12)1100Hz
		START	
ROM CHECK	Service Mode	"5" "5" "1"	Indicates the version and checks the sum of the F
		START	
SCAN CHECK	Service Mode	"5" "5" "5"	Turns on the LEDs of the CIS and operates the re systems.
		START	
LCD CHECK	Service Mode	"5" "5" "8"	Checks the LCD indication. Illuminates all the dots to check if they are norma
		START	
DTMF SINGLE TEST	Service Mode	"5" "5" "2"	Outputs the DTMF as single tones. Used to check frequencies of the individual DTMF tones. Refer to SINGLE TONE TRANSMIT SELECTION ().
		1...ON 2...OFF	
LED CHECK	Service Mode	"5" "5" "7"	All LEDs above the operation panel board flash or or are illuminated.
		START	
KEY CHECK	Service Mode	"5" "6" "1"	Checks the button operation. Indicates the button code on the LCD while the bu pressed. Refer to BUTTON CODE TABLE ().
		START (any key)	
FACTORY SET	Service Mode	"5" "5" "0"	Clears the memory where the users can store dat
		START	
PRINT TEST PATTERN	Service Mode	"8" "5" "2"	Prints out the test pattern. Used mainly at the factory to test the print quality You can select 1~4. (See PRINT TEST PATTERN (
		START	
DIGITAL SPEAKERPHONE RX & TX CHECK	Service Mode	"8" "4" "1"	Please refer to DIGITAL SPEAKERPHONE ()
		SPEAKERPHONE	

Test Mode	Type of Mode	Code	Function
		Operation after code input	
SENSOR CHECK & VOX CHECK	Service Mode	"8" "1" "5"	<p>If you enter this mode and operate sensor levers 1 hands, the LCD display of the related sensor (or s turns ON / OFF. Also, when copying a document, related sensor will turn ON / OFF. (Do, Sn, Co, Pt, For each sensor's operation, refer to SENSORS AND SWITCHES().</p> <p>[Do Sn Co Pt Vx] : LCD DISPLAY</p> <p>Do: Document set sensor :Paper inserted. Turns on when a document is ins</p> <p>Sn: Read position sensor. :At the read position, turns on when the front cov opened and the sensor lever is pressed directory.</p> <p>Co: Cover open sensor / Film end sensor :Cover open of don't set the film. Turns on and of front cover is opened and closed.</p> <p>Pt: Paper top sensor :Sensor on Turns on when the front cover is open the sensor lever is pressed directly.</p> <p>Vx: Vox signal :Detection signal for the tone on the line. Turns on there is a tone signal on the line.</p>
		START	

2.6.1. DTMF SINGLE TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	key	Low Frequency (Hz)
“1”	697	“5”	1209
“2”	770	“6”	1336
“3”	852	“7”	1477
“4”	941	“8”	1633



When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz)	1209	1336	1477
Low (Hz)			
697	“1”	“2”	“3”
770	“4”	“5”	“6”
852	“7”	“8”	“9”
941	“✕”	“0”	“#”

Note:

After performing this check, do not forget to turn the setting off.
Otherwise, dialing in DTMF signal will not work.

2.6.2. BUTTON CODE TABLE

Code	Button Name	Code	Button Name	Code	Button Name
02	RESOLUTION	25	 VOLUME	3B	✕
04	START / COPY / SET	26	 VOLUME	3C	#
05	LOWER	31	1	3D	REDIAL / PAUSE
08	SP-PHONE	32	2	3E	FLASH
0A	MUTE	33	3	49	QUICK SCAN
0C	AUTO ANSWER	34	4	1E	EASY DIAL (FWD)
14	RECORD	35	5	1F	EASY DIAL (BACK)
16	ERASE	36	6	00	NO INPUT
18	PLAY MESSAGE	37	7	01	STOP
20	MENU	38	8		
22	HELP	39	9		
24	DIRECTORY	3A	0		

2.6.3. PRINT TEST PATTERN

1. Platen roller

(Reference pattern)

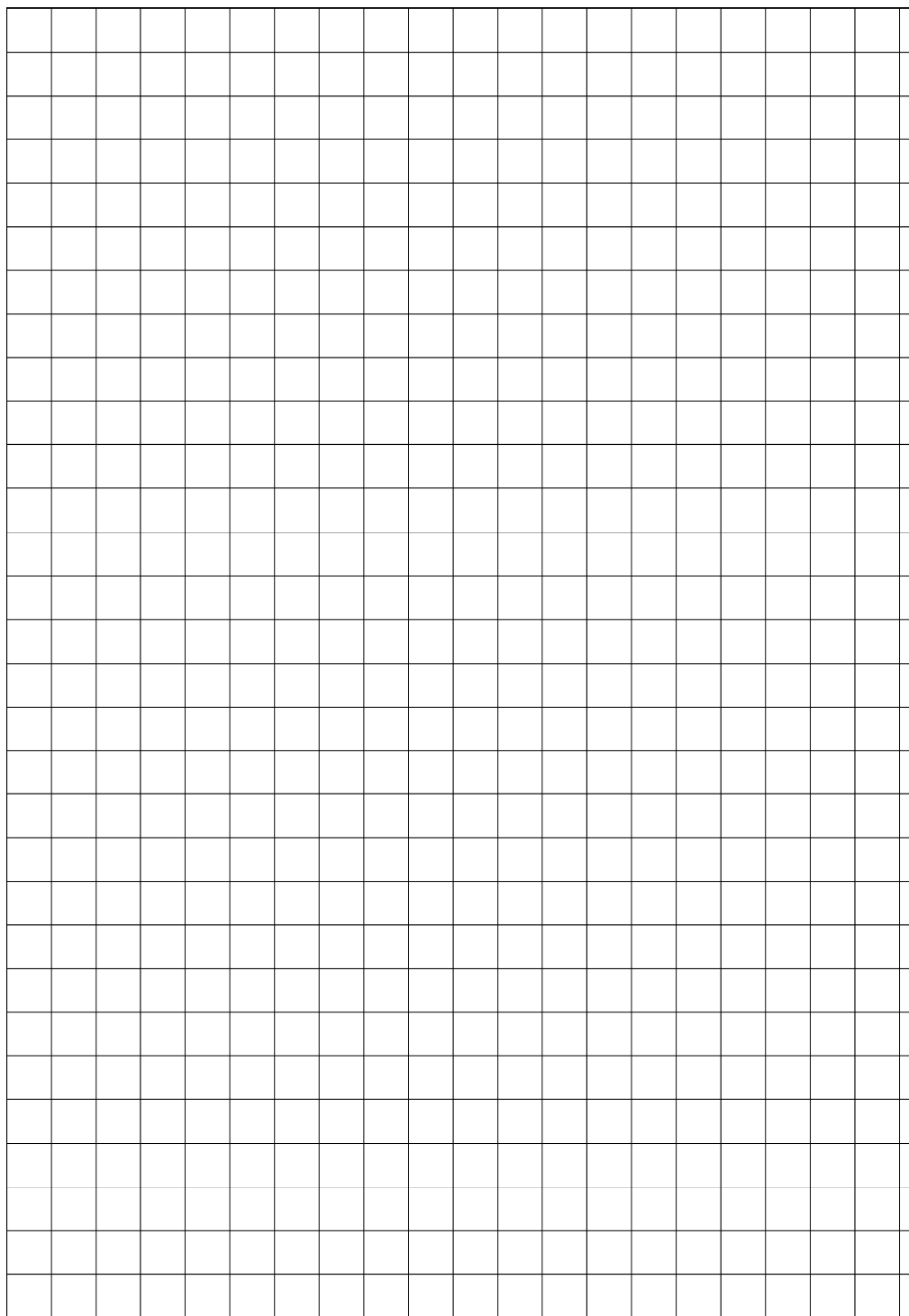


about
1 cm



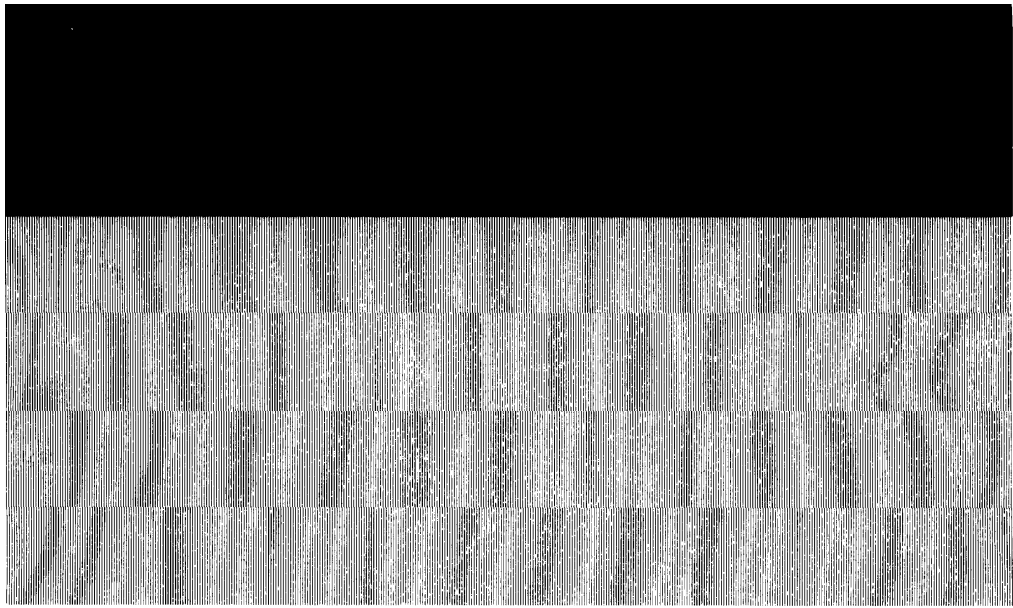
2. Left margin/Top margin

(Reference pattern)



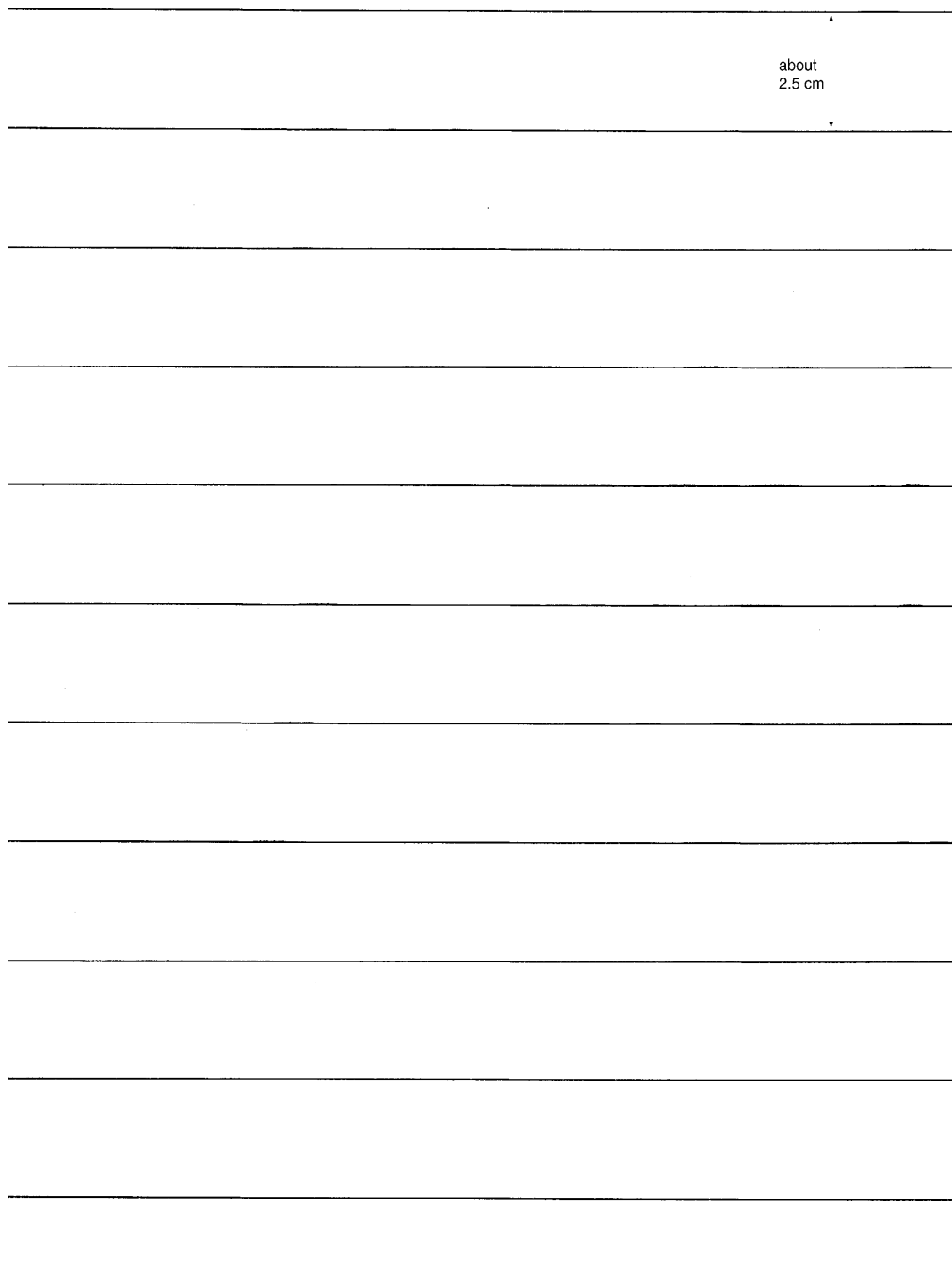
3. Thermal head 1 dot

(Reference pattern)



4. Use this test pattern to confirm the torque limiter for Ink film and platen roller timing.

(Reference pattern)



3. ADJUSTMENTS

3.1. ADJUSTING THE FEEDER PRESSURE

If misfeeding of a document such as multiple feeding or no feeding occurs frequently, try to adjust the feeder pressure by following the steps below.

- 1. Open the front cover by pulling up the center part.**
- 2. Shift the position of the green lever by using an instrument with a**

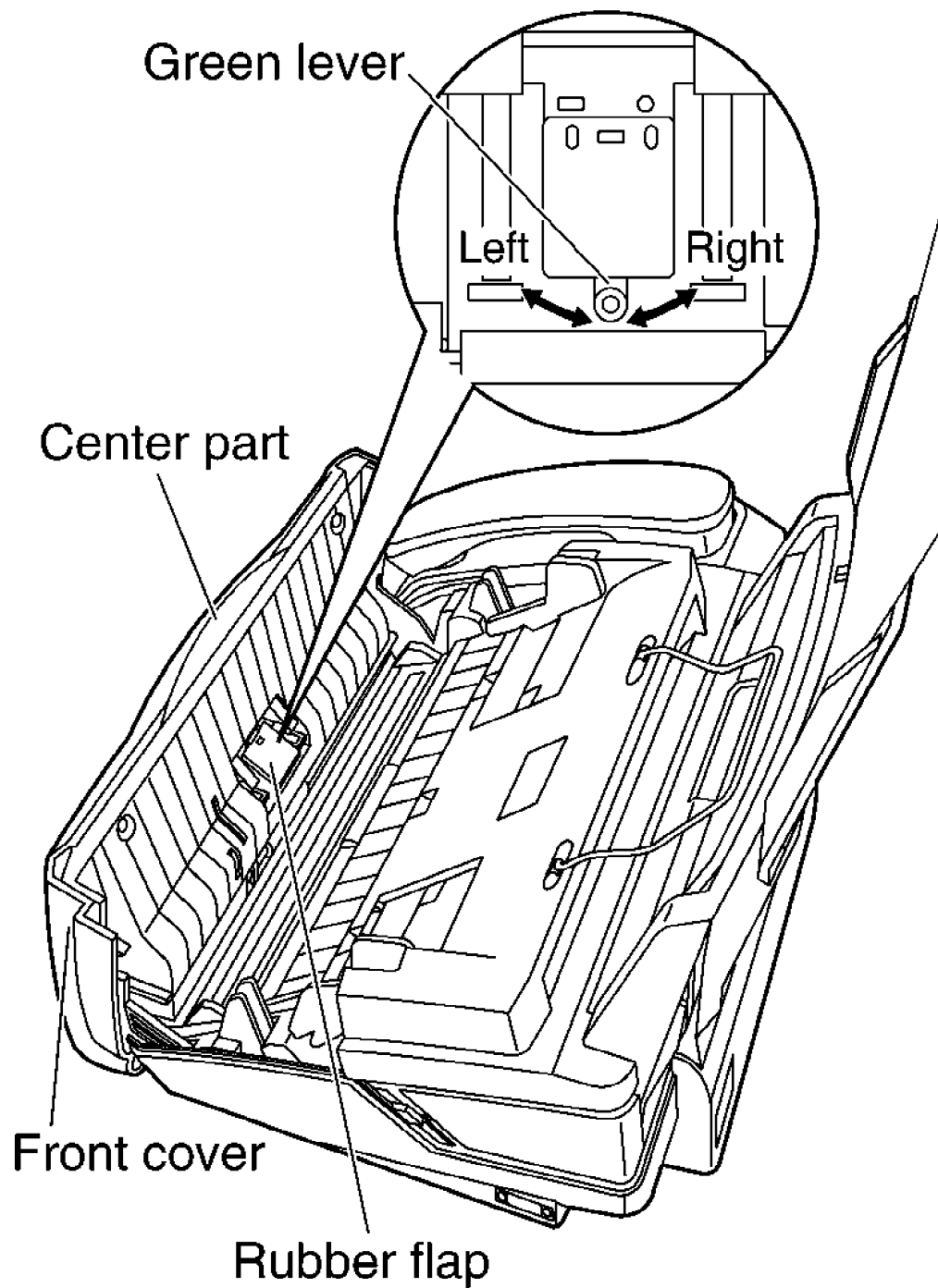
pointed end, such as a paper clip.

Left: When documents multiple feed.

Center: Standard position (pre-selected)

Right: When documents do not feed.

3. Close the front cover securely.



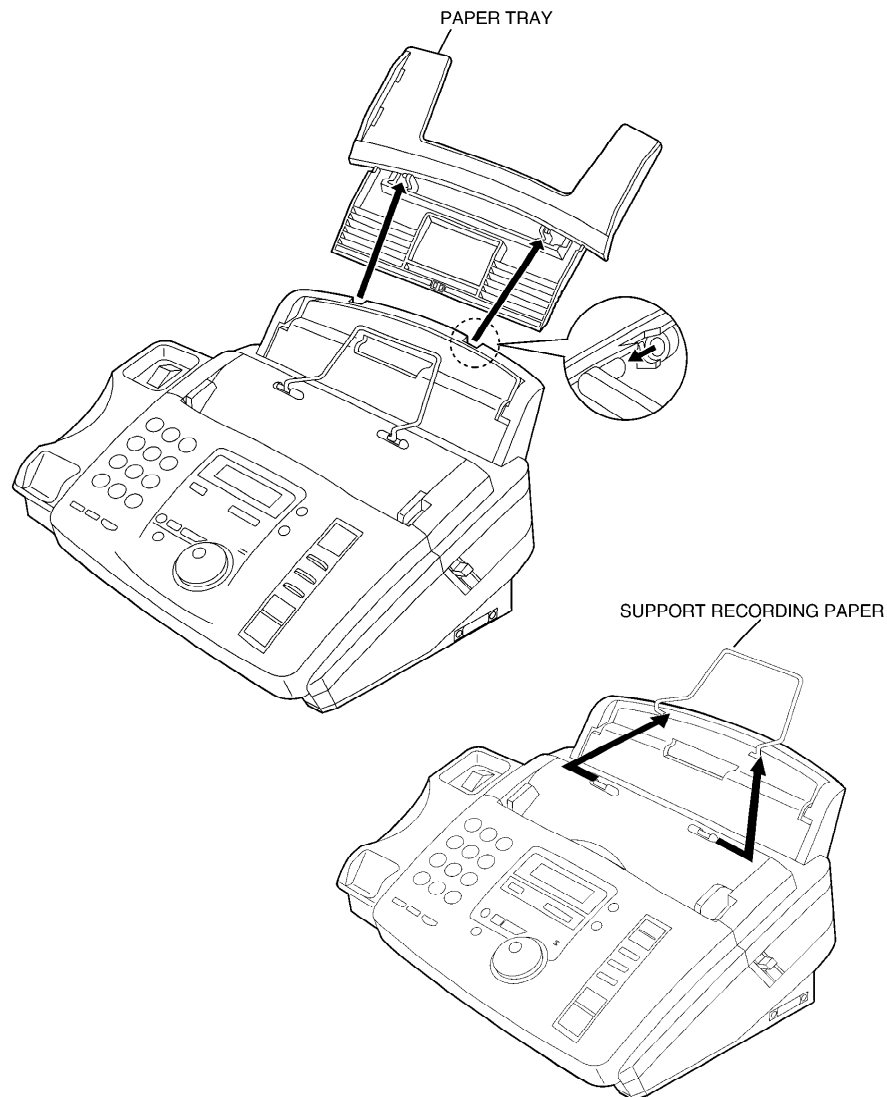
4. DISASSEMBLY INSTRUCTIONS

4.1. HOW TO REMOVE THE PAPER TRAY AND SUPPORT RECORDING PAPER

Procedure: 1

REF No. 1

- 1) Pull up and remove the PAPER TRAY in the direction of the arrow.
- 2) Remove the SUPPORT RECORDING PAPER in the direction of the arrow.

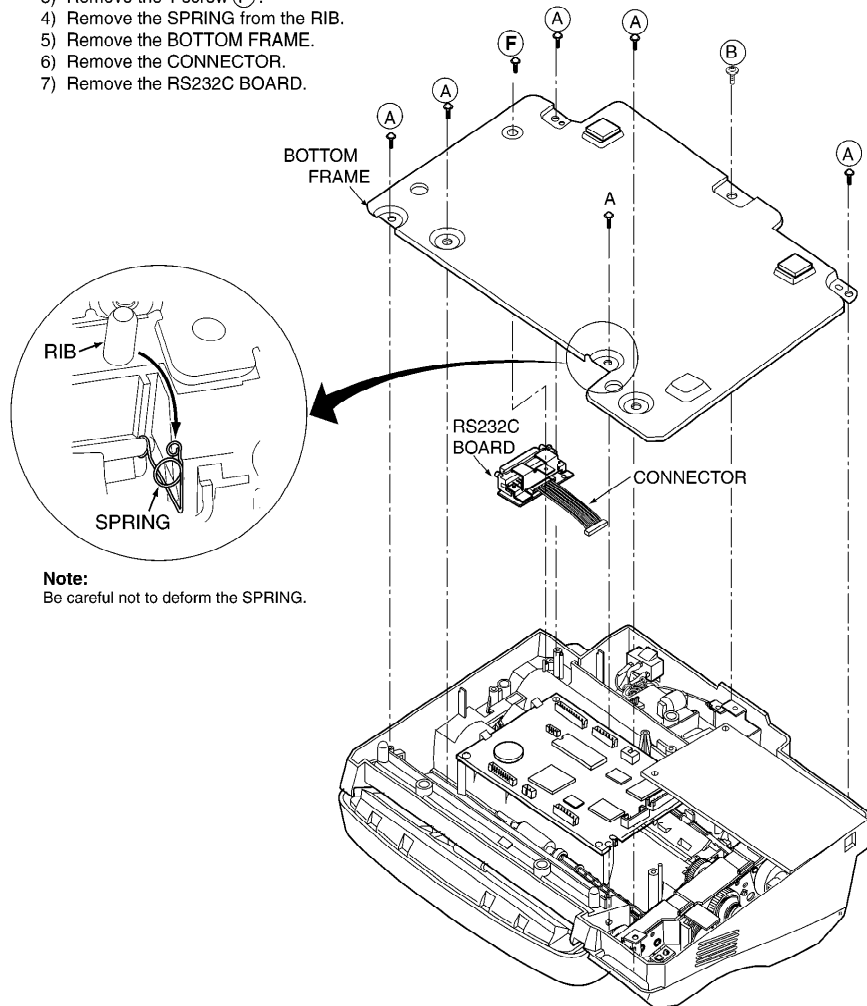


4.2. HOW TO REMOVE THE BOTTOM FRAME

Procedure: 2

REF No. 2

- 1) Remove the 6 screws (A).
- 2) Remove the 1 screw (B).
- 3) Remove the 1 screw (F).
- 4) Remove the SPRING from the RIB.
- 5) Remove the BOTTOM FRAME.
- 6) Remove the CONNECTOR.
- 7) Remove the RS232C BOARD.

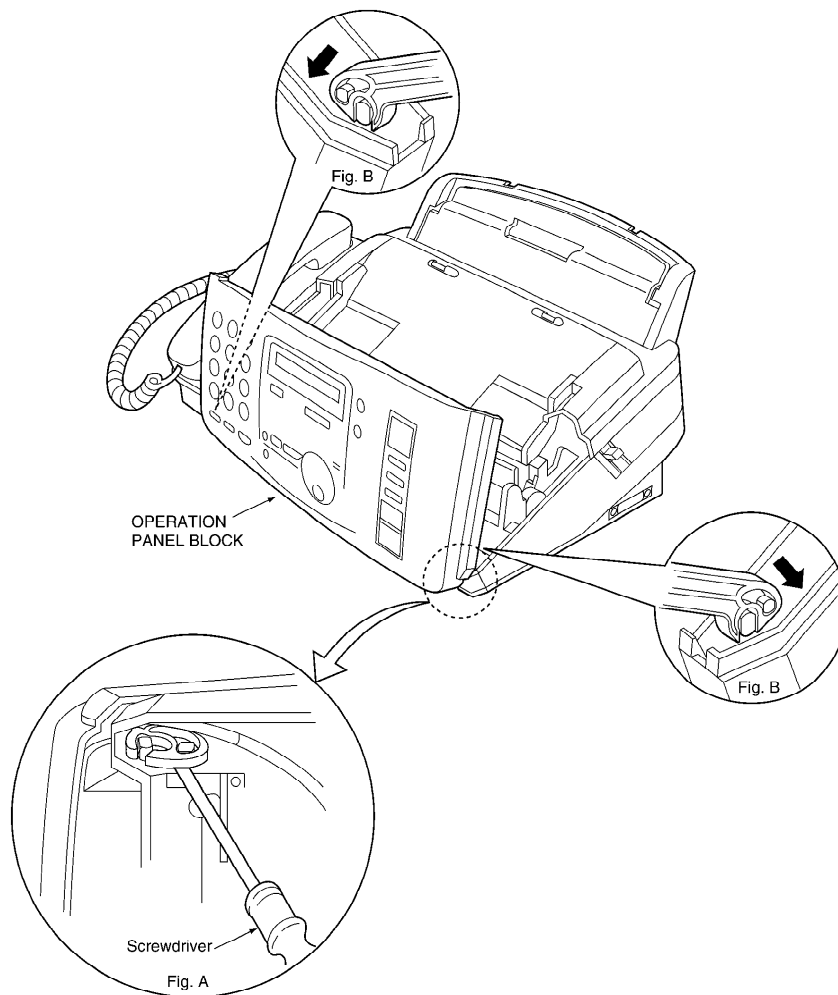


4.3. HOW TO REMOVE THE OPERATION PANEL BLOCK

Procedure: 2-->3

REF No. 3

- 1) Unhook all the connectors connecting the main cabinet with the OPERATION PANEL BLOCK.
- 2) Open the OPERATION PANEL BLOCK by pulling up the center part.
- 3) Tilt the unit vertically so that its left side faces down the grey-shaded ARM as illustrated in Fig. A, insert a screwdriver and unlatch the ARM as illustrated in Fig. A.
- 4) Pull out both sides of the arms (in the direction of the arrow shown in Fig. B).
- 5) Remove the OPERATION PANEL BLOCK.



4.4. HOW TO REMOVE THE OPERATION BOARD AND LCD

Procedure: 2-->3-->4

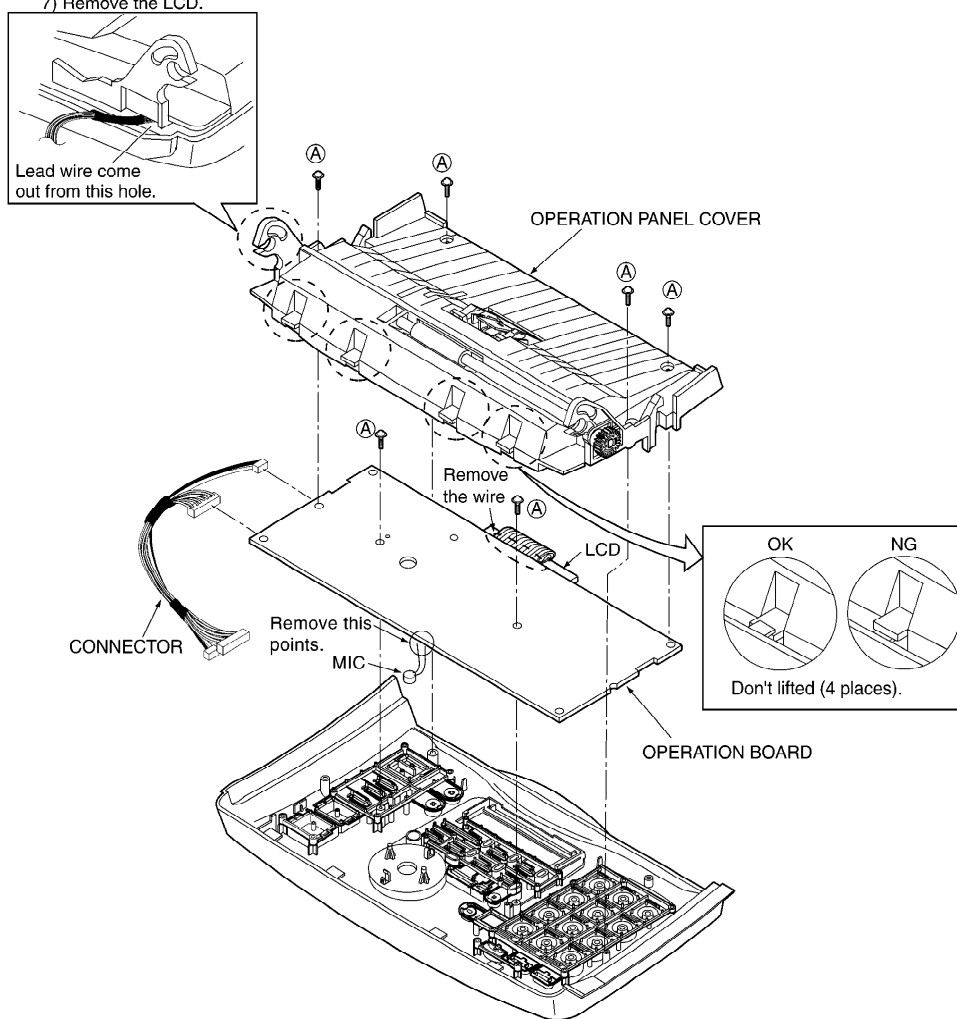
REF No. 4

<OPERATION PANEL COVER>

- 1) Remove the 4 screws (A) .
- 2) Remove the OPERATION PANEL COVER.

<OPERATION BOARD>

- 3) Remove the 2 screws (A) .
- 4) Disconnect the CONNECTOR.
- 5) Remove the OPERATION BOARD.
- 6) Remove the wire for LCD.
- 7) Remove the LCD.



4.5. HOW TO REMOVE THE ANALOG, DIGITAL AND POWER BOARDS AND AC INLET

<ANALOG BOARD>

- 1) Remove the 2 screws (A) and 1 screw (C).
- 2) Disconnect the CONNECTOR-A.
- 3) Remove the ANALOG BOARD.

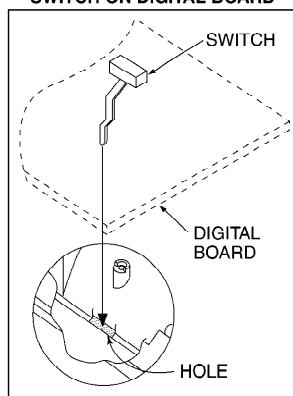
<DIGITAL BOARD>

- 4) Disconnect the CONNECTORs-B.
- 5) Remove the 3 screws (A).
- 6) Remove the DIGITAL BOARD.

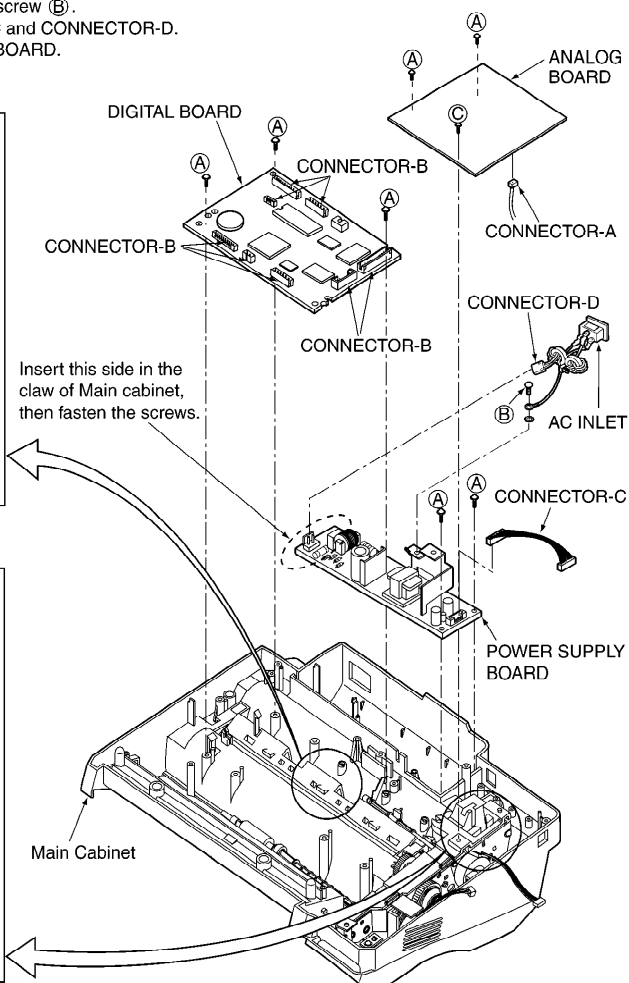
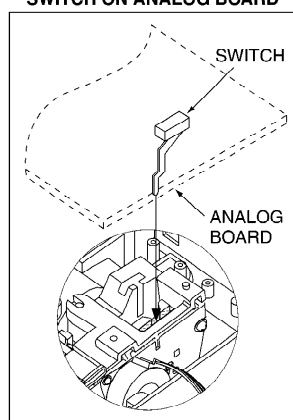
<POWER SUPPLY BOARD>

- 7) Remove the 2 screws (A) and 1 screw (B).
- 8) Disconnect the CONNECTOR-C and CONNECTOR-D.
- 9) Remove the POWER SUPPLY BOARD.
- 10) Remove the AC INLET.

SWITCH ON DIGITAL BOARD



SWITCH ON ANALOG BOARD

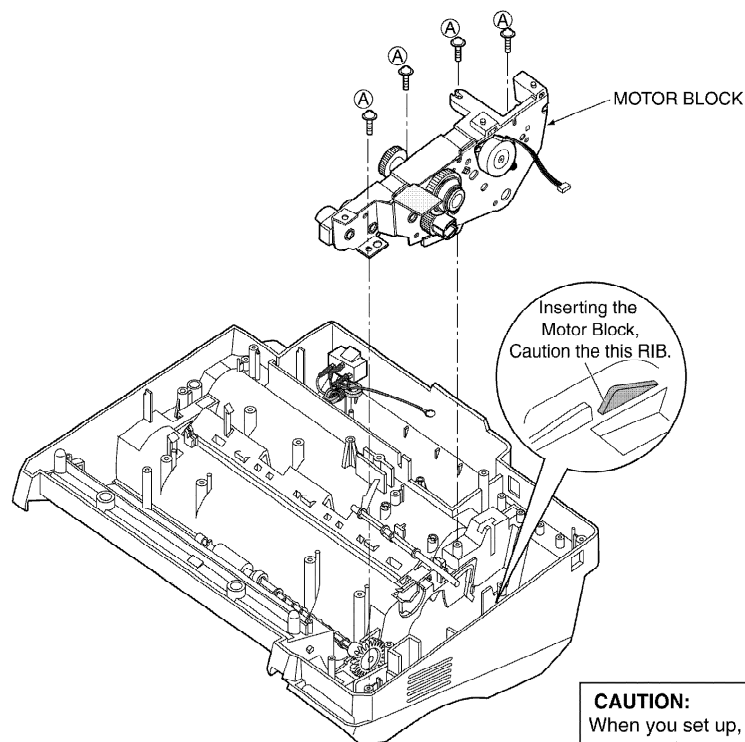


4.6. HOW TO REMOVE THE MOTOR BLOCK

Procedure: 2-->5-->6(a)

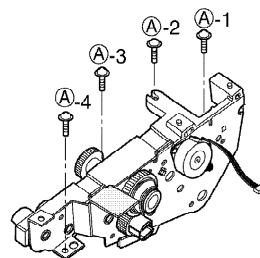
REF No. 6(a)

- 1) Remove the 4 screws (A).
- 2) Remove the MOTOR BLOCK. [See REF No. 6(b)]



CAUTION:

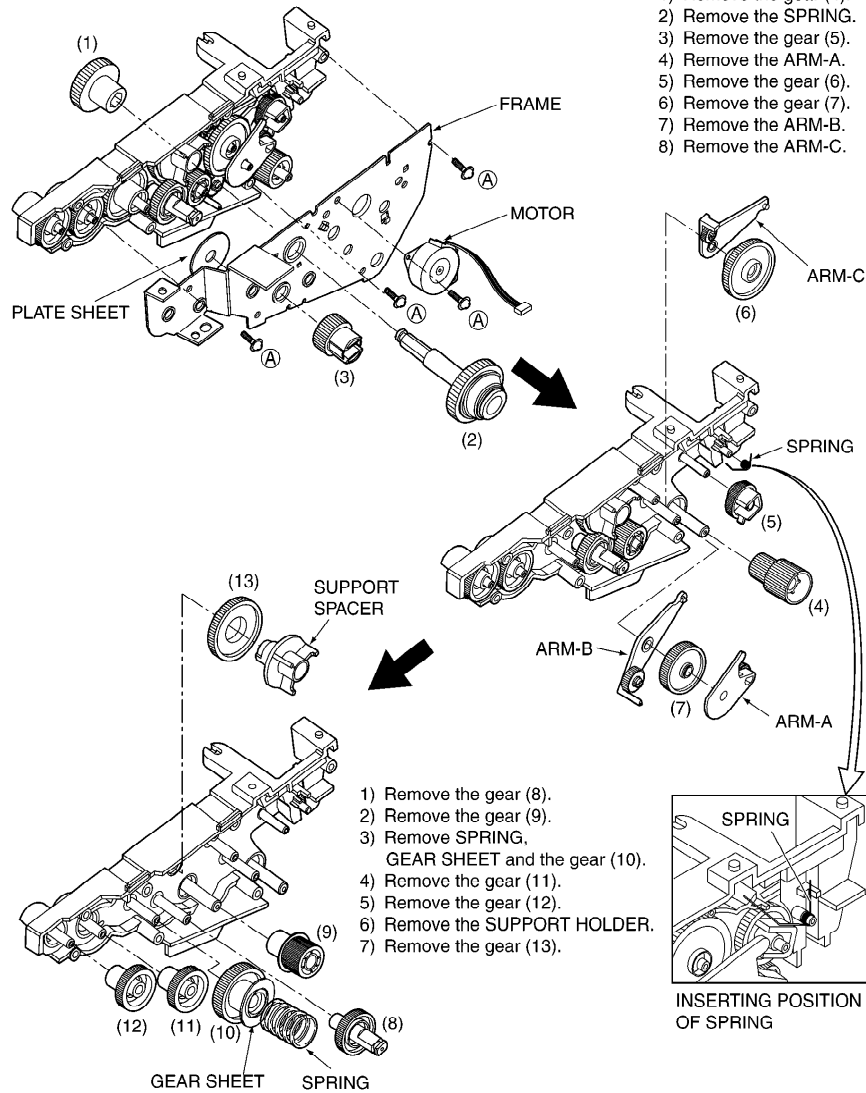
When you set up, fasten these screws in order of number below.



Procedure: 2-->5-->6(a)-->6(b)

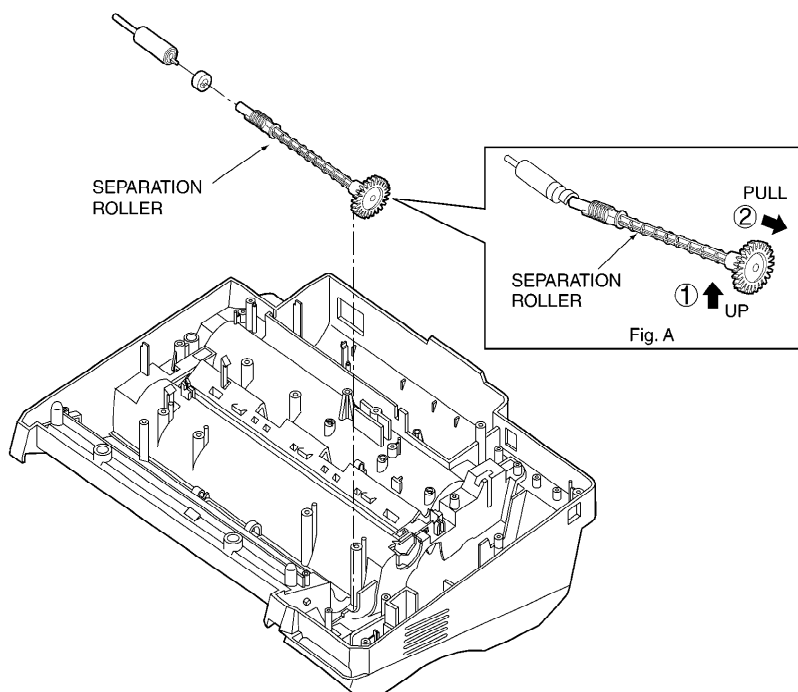
REF No. 6(b)

- 1) Remove the 4 screws (A).
- 2) Remove the MOTOR, FRAME and PLATE SHEET.
- 3) Remove the gear (1). (See Fig. A)
- 4) Remove the gear (2).
- 5) Remove the gear (3). (See Fig. B)



4.7. HOW TO REMOVE THE SEPARATION ROLLER

- 1) Remove the SEPARATON ROLLER (Fig. A).

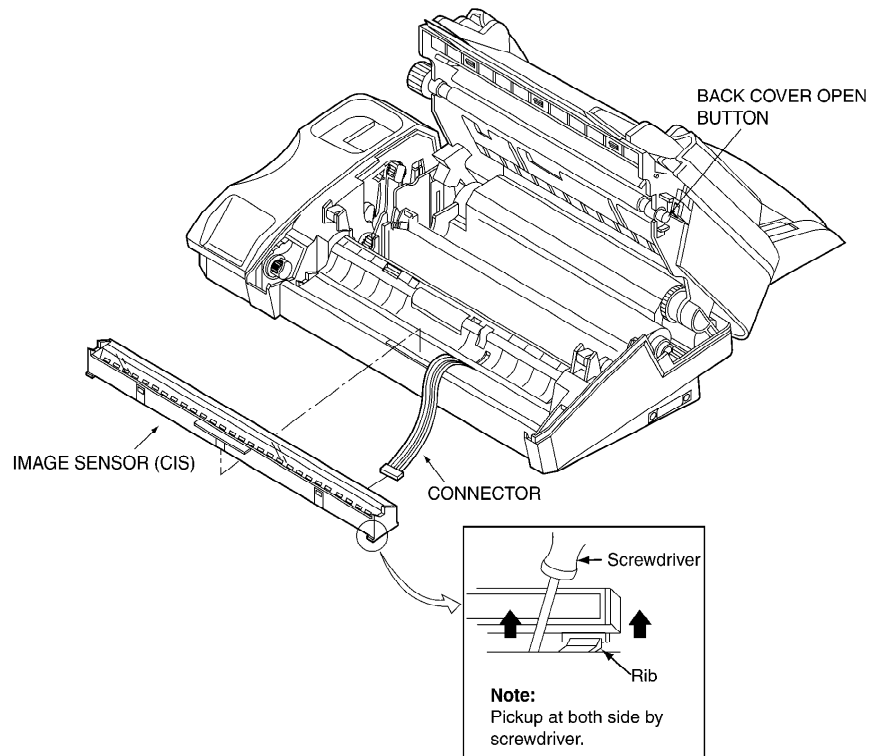


4.8. HOW TO REMOVE THE IMAGE SENSOR (CIS)

Procedure: 2-->3-->5-->8

REF No. 8

- 1) Push the BACK COVER OPEN BUTTON to open back cover.
- 2) Remove the CONNECTOR.
- 3) Remove the IMAGE SENSOR as illustrated below.

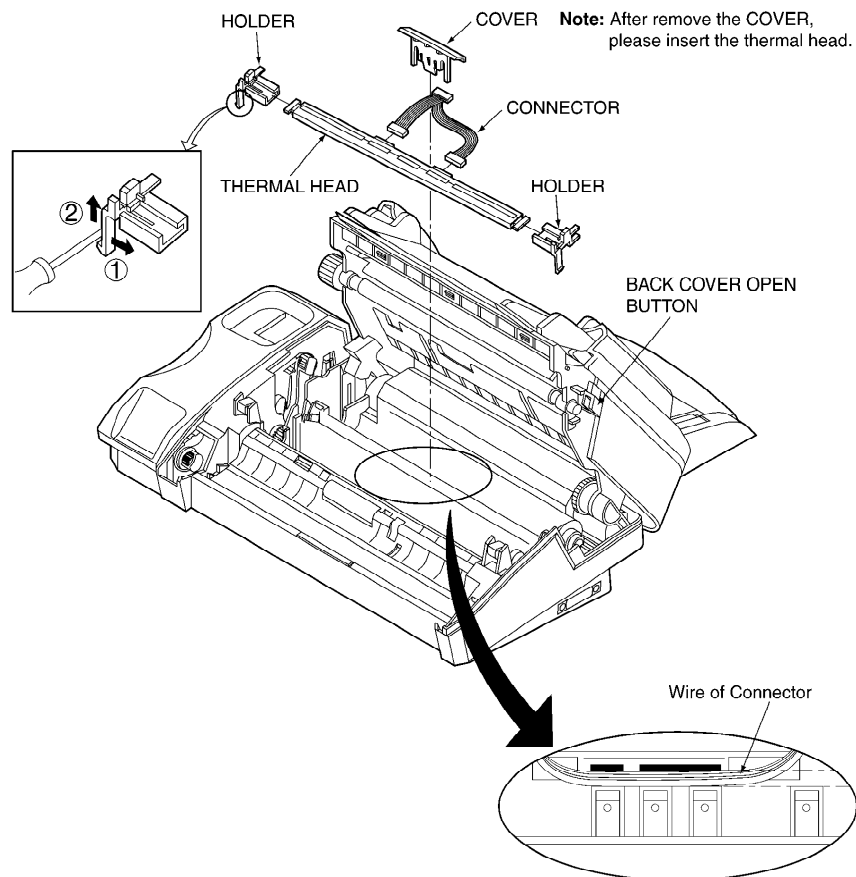


4.9. HOW TO REMOVE THE TERMAL HEAD

Procedure: 2-->5-->9

REF No. 9

- 1) Push the BACK COVER OPEN BUTTON to open back cover.
- 2) Remove the 2 HOLDERS and CONNECTOR.
- 3) Remove the THERMAL HEAD.

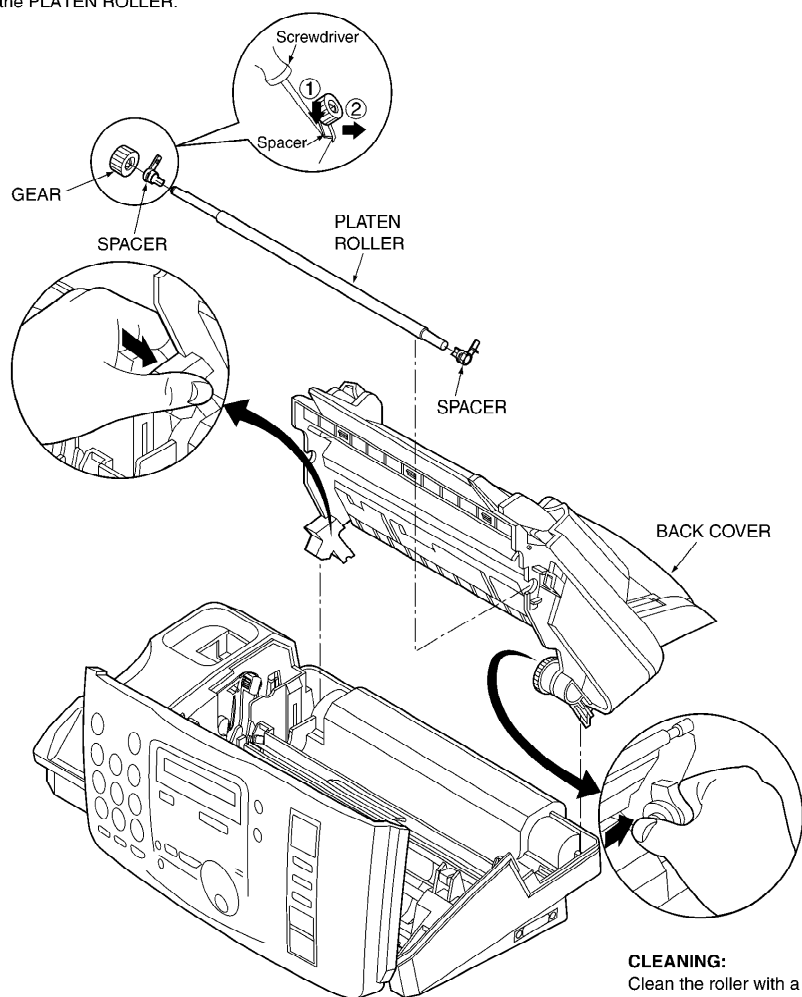


4.10. HOW TO REMOVE THE PLATEN ROLLER, BACK COVER

Procedure: 10

REF No. 10

- 1) Remove the FILM CARTRIDGE.
- 2) Push the BACK COVER OPEN BUTTON to open back cover.
- 3) Push the left arm (a) inside, then the BACK COVER will be stood because the stopper will be released.
- 4) Push both side arms of the BACK COVER to outside, then move the cover up.
- 5) Remove the BACK COVER.
- 6) Remove the 2 SPACERS from the ribs as illustrated below.
- 7) Remove the GEAR.
- 8) Remove the PLATEN ROLLER.



4.11. HOW TO REMOVE THE PICKUP ROLLER

Procedure: 10-->11

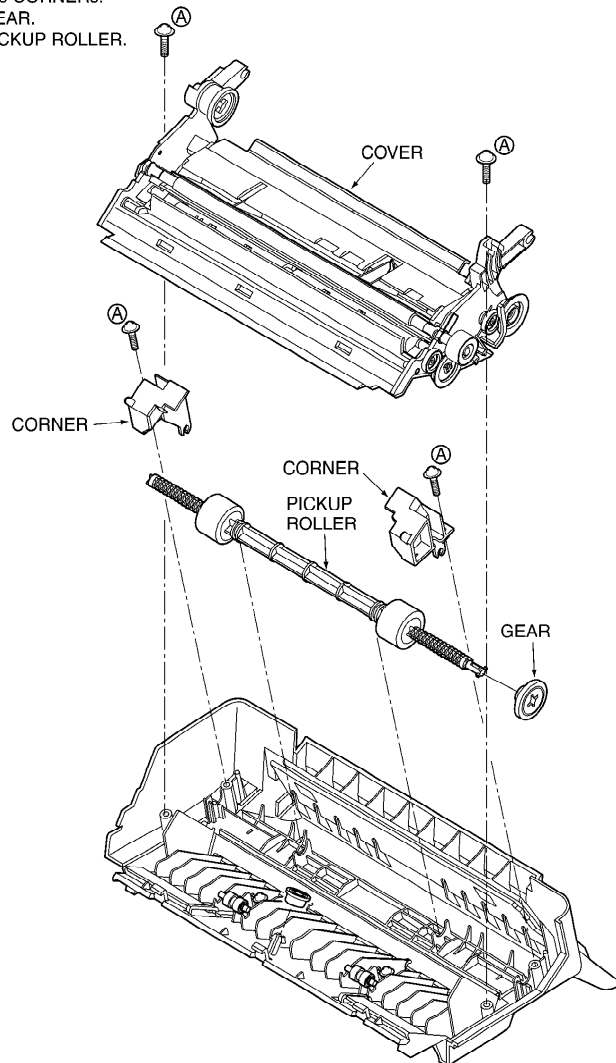
REF No. 11

<COVER>

- 1) Remove the two screws
- 2) Remove the COVER.

<PICKUP ROLLER>

- 3) Remove the two screws
- 4) Remove the two CORNERS.
- 5) Remove the GEAR.
- 6) Remove the PICKUP ROLLER.



CLEANING:
Clean the roller with
a cloth soaked in alcohol.

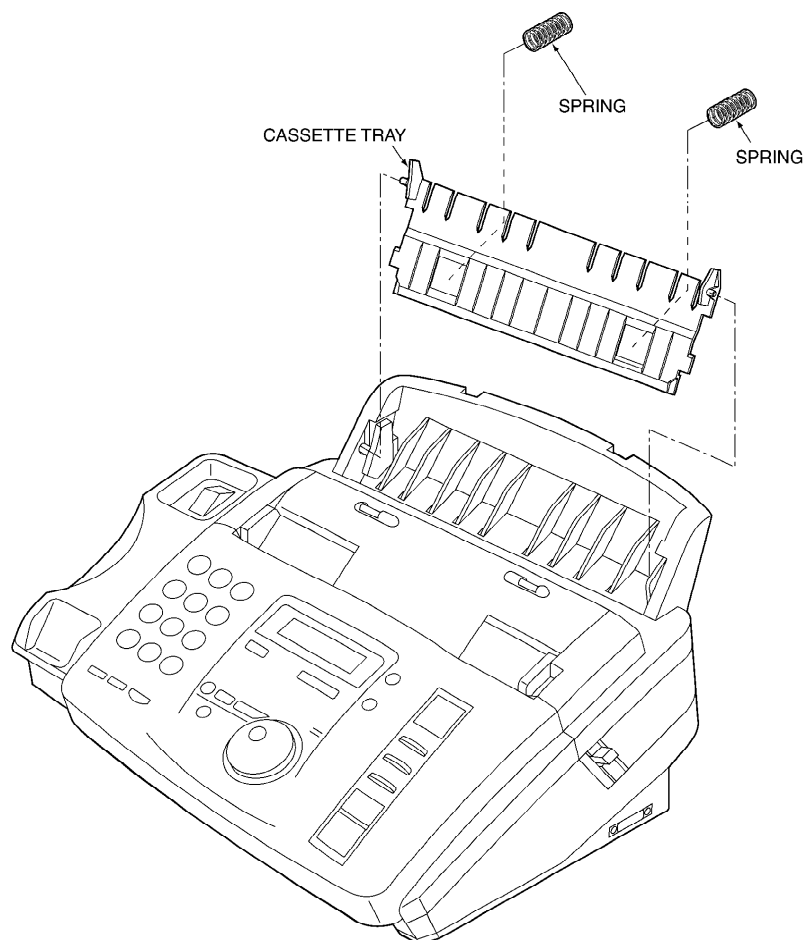
4.12. HOW TO REMOVE THE CASSETTE TRAY

Procedure: 12

REF No. 12

1) Pull up and remove the CASSETTE TRAY in the direction of the arrow.

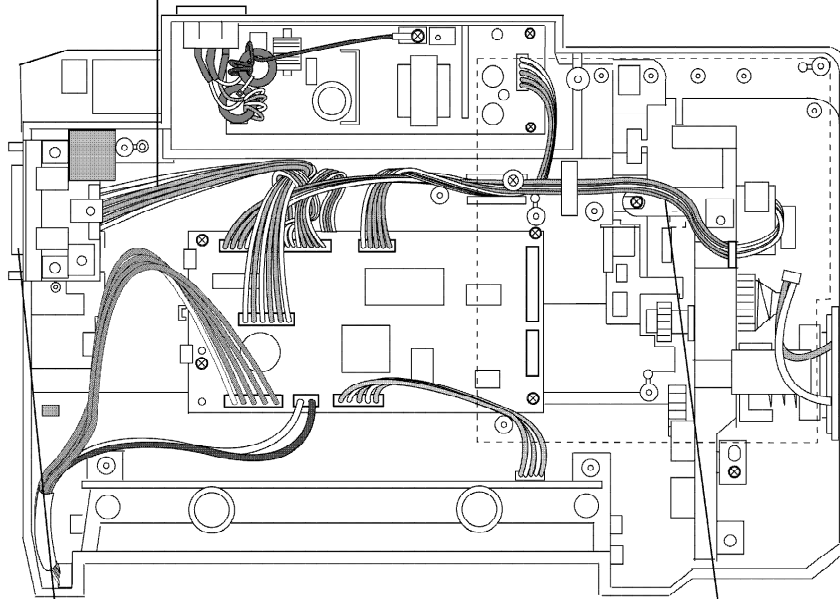
Note: Inserting the CASSETTE TRAY to the unit, then insert the 2 SPRINGS.



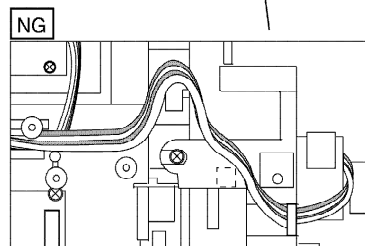
4.13. INSTALLATION POSITION OF THE LEAD WIRES

4.13.1. KX-FM89BX

Hook LEAD / RS232C on LEAD / HEAD.

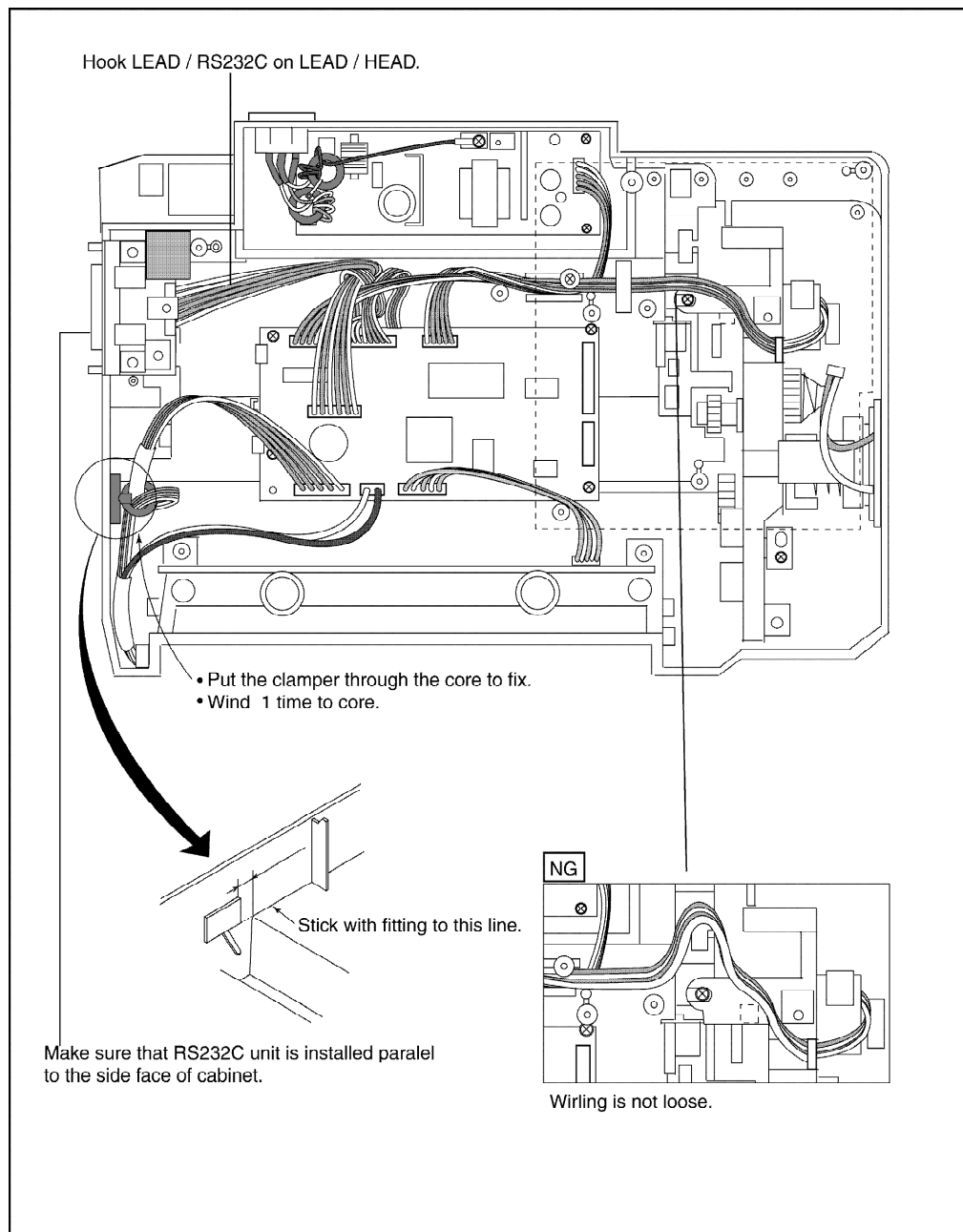


Make sure that RS232C unit is installed parallel to the side face of cabinet.



Wiring is not loose.

4.13.2. KX-FM89CX



5. HOW TO REPLACE THE FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

5.1. PREPARATION

- SOLDER

Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA

- Soldering iron

Recommended power consumption is between 30 W to 40 W. / Temperature of Copper Rod $662 \pm 50^{\circ}\text{F}$ ($350 \pm 10^{\circ}\text{C}$) / (An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)

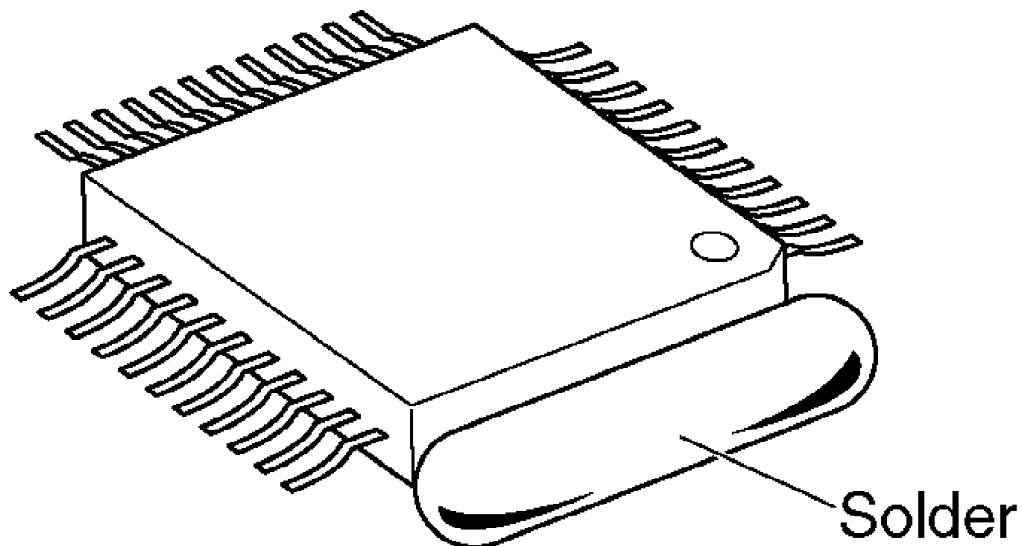
- Flux / HI115 Specific gravity 0.863 / (Original flux should be replaced daily.)

5.2. FLAT PACKAGE IC REMOVAL PROCEDURE

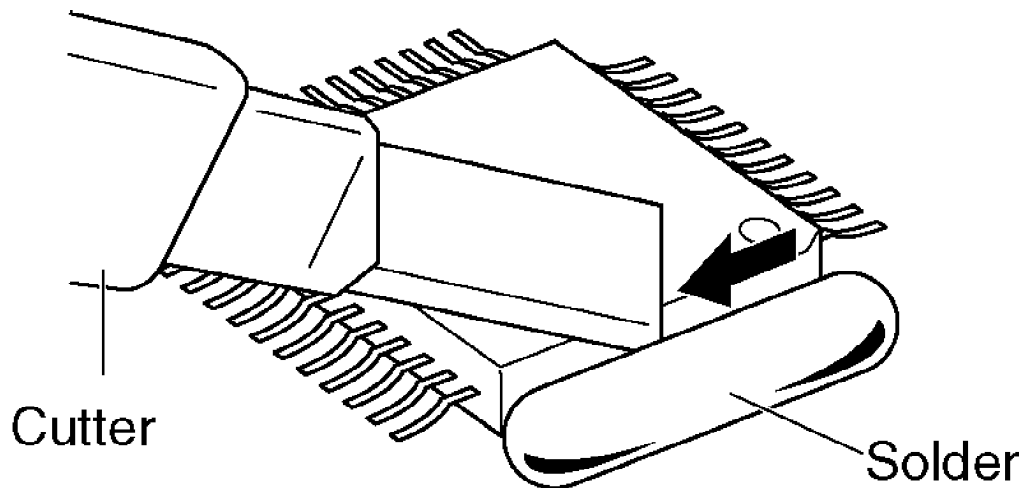
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

Note:

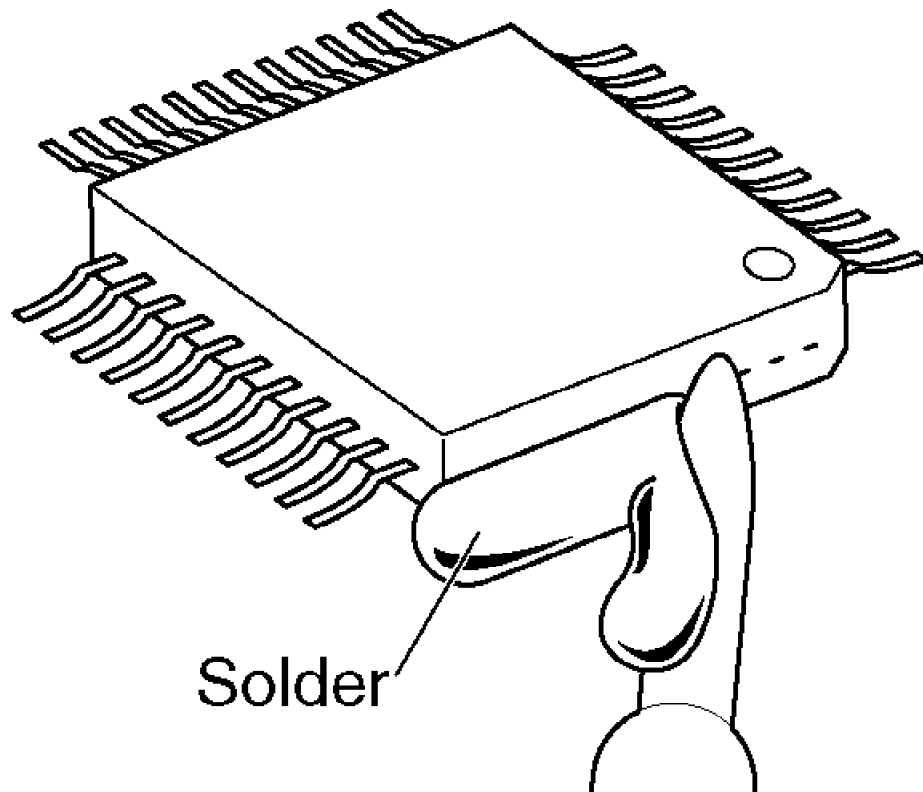
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



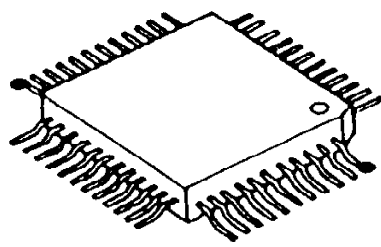
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

5.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

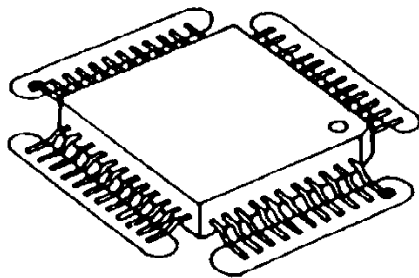
1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.



● - - - - - Temporary soldering point.

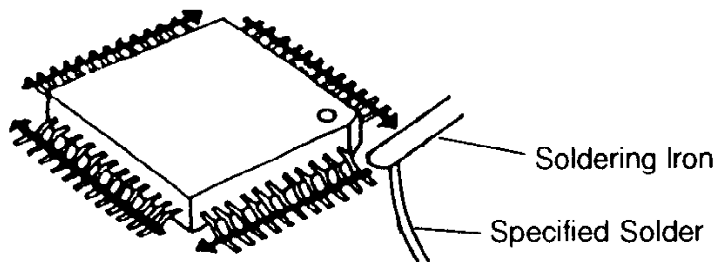
*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux to all pins of the FLAT PACKAGE IC.



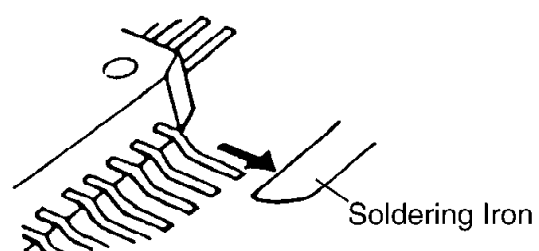
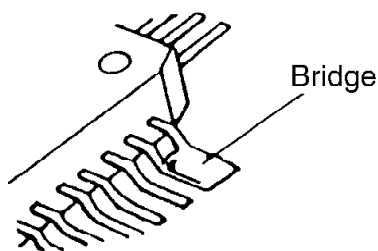
- - - - - Flux

3. Solder the pins, sliding the soldering iron in the direction of the arrow.

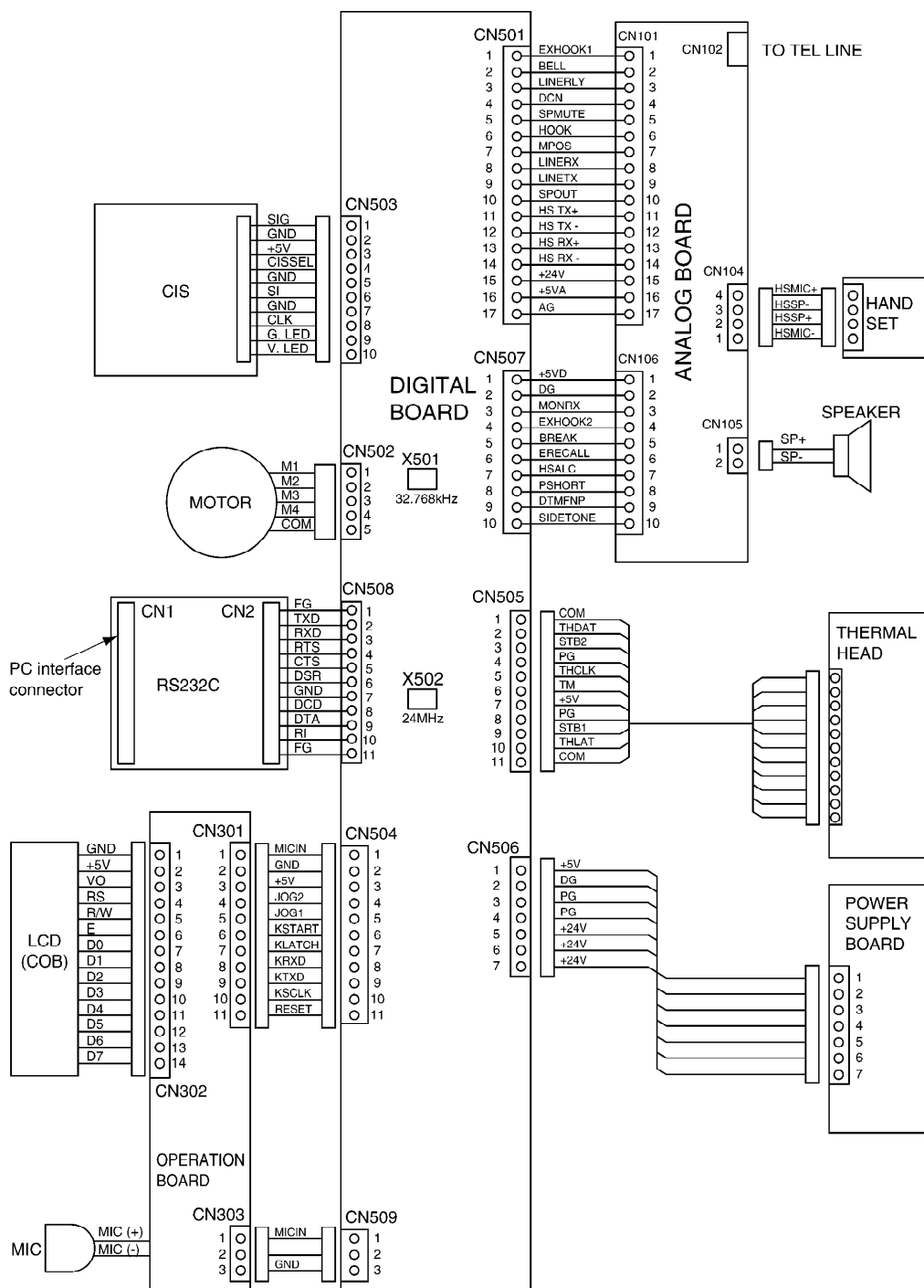


5.4. BRIDGE MODIFICATION PROCEDURE

1. Lightly resolder the bridged portion.
2. Remove the remaining solder along the pins using a soldering iron as shown in the figure below.



6.1. CONNECTION DIAGRAM



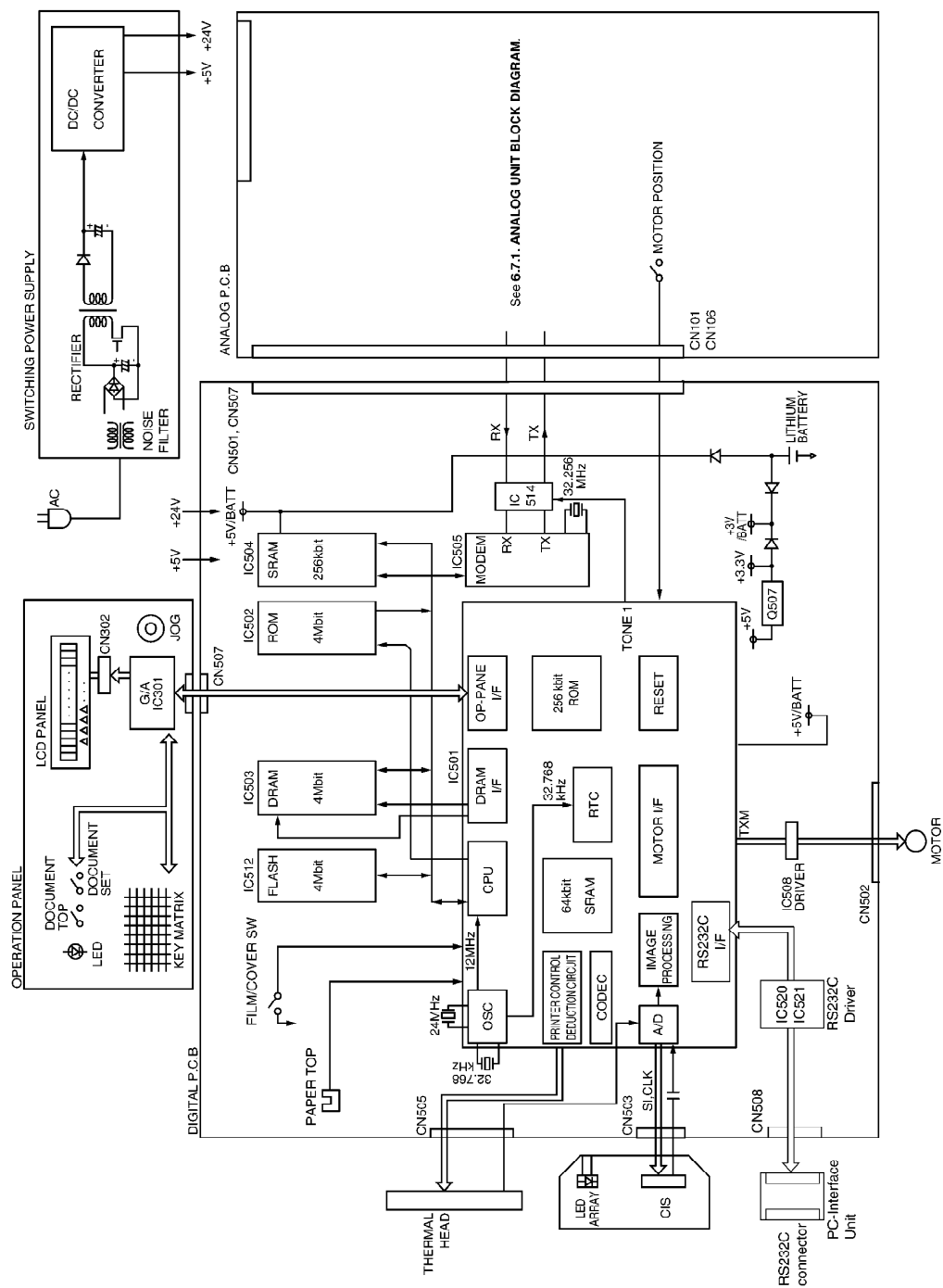
6.2. GENERAL BLOCK DIAGRAM

The following is an outline of each device IC on the digital board. (Refer to **GENERAL BLOCK DIAGRAM**()).

1. ASIC (IC501)

- Composed mainly of an address decoder and a modem control.
- Controls the general FAX operations.
- Controls the operation panel I/F.
- Controls the thermal head I/F and CIS I/F.
- Performs the image processing.
- CPU and Real time clock
- Provides the reset pulse for each of the major ICs.
- 2. ROM (IC502)
 - Contains all of the program instructions on the unit operations.
- 3. Static RAM (IC504)
 - This memory is used mainly for the parameter working in the storage area.
- 4. Dynamic RAM (IC503)
 - This memory is used mainly for the parameter working in the storage area.
- 5. MODEM (IC505)
 - Performs the modulation and the demodulation for FAX communication.
- 6. Read Section
 - CIS image sensor to read transmitted documents.
- 7. Motor Driver (IC508)
 - Drives the transmission motor and the reception motor.
- 8. Thermal Head
 - Contains heat-emitting elements for dot matrix image printing.
- 9. Analog Board
 - Composed of ITS circuit and NCU circuit.
- 10. Sensor Section
 - Composed of a cover open and film end switch, a document set switch, a document top switch, a paper top sensor and a motor position switch.
- 11. Power Supply Board Switching Section
 - Supplies +5V and +24V to the unit.
- 12. Flash Memory (IC512)
 - This memory is used for voice prompt and TAM.

6.2.1. GENERAL BLOCK DIAGRAM



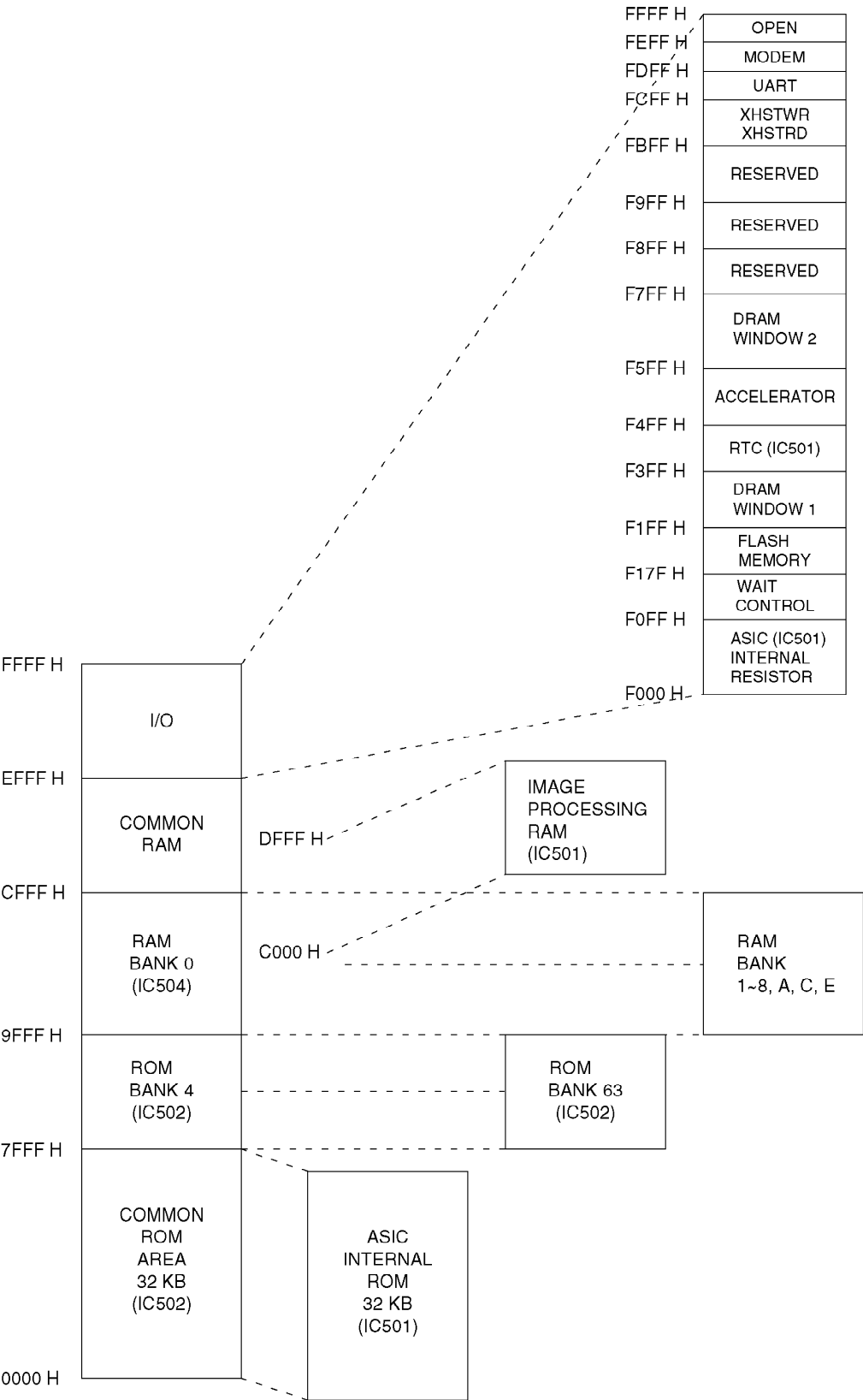
CROSS REFERENCE:

ANALOG UNIT BLOCK DIAGRAM()

6.3. CONTROL SECTION

6.3.1. BLOCK DIAGRAM

6.3.2. MEMORY MAP



6.3.3. ASIC (IC501)

This custom IC is used for the general FAX operations.

1. CPU:

This model uses a Z80 equivalent to the CPU operating at 8 MHz. Most of the peripheral functions are performed by custom-designed LSIs. Therefore, the CPU only works for processing the results.

2. RTC:

Real Time Clock

3. DECODER:

Decodes the address.

4. ROM/RAM I/F:

Controls the SELECT signal of ROM or RAM and the bank switching.

5. CIS I/F:

Controls the document reading.

6. IMAGE DATA RAM:

This memory is programmed into the ASIC and uses 8 KB for the image processing. (See Fig. A.*)

7. THERMAL HEAD I/F:

Transmits the recorded data to the thermal head.

8. MOTOR I/F:

Controls the transmission motor which feeds the document.

Controls the receiving motor which feeds the recording paper.

9. OPERATION PANEL I/F:

Serial interface with Operation Panel.

10. I/O PORT:

I/O Port Interface.

11. ANALOG UNIT:

Electronic volume for the handset and the monitor.

Sends beep tones, etc.

Fig. A

DFFF H

SHADING
DATA
2KB

D800 H

IMAGE PROCESSING
WORK 1KB

D000 H

LINE MEMORY
4 LINE 1KB

n-1/n+1 LINE
MEMORY 2KB

C800 H

n LINE MEMORY 2KB

C000 H

(CPU ADDRESS)

Note*:

This memory is incorporated into the ASIC (IC501) and used for the image processing.
Fig. A shows the memory map of the Image Data RAM.

6.3.4. ROM (IC502)

This 512KB ROM (EPROM or MASKROM) carries a common area of 32KB and bank areas which each have 8KB (BK4~BK63). The addresses from 0000H to 7FFFH are for the common area and from 8000H to 9FFFH are for the bank areas.

6.3.5. STATIC RAM (IC504)

This 32KB RAM carries a common area of 8KB and bank areas which each have 12KB. The addresses from 0000H to EFFFH are for the common area and from A000H to CFFFH are for the bank area.

6.3.6. DYNAMIC RAM (IC503)

The DRAM serves as CPU and receives memory.

The address is F200H~F3FFH (DRAM access window 1) and F600H~F7FFH (DRAM access window 2).

Descriptions of Pin Distribution (IC501)

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
1	AIN1	A	3.3V	CCD IMAGE SIGNAL INPUT
2	AIN2	A	3.3V	THERMISTOR TEMPERATURE WATCH INPUT
3	AIN3	A	3.3V	-----
4	AMON	A	3.3V	ANALOG SIGNAL MONITOR TERMINAL
5	VSSB		GND	POWER SOURCE (ANALOG GN
6	VDDDB		3.3V	POWER SOURCE (ANALOG +3.
7	VDD(3.3V/B)		3.3V/BATT	POWER SOURCE (+3.3V/LITHIU BATTERY)
8	X32OUT	O	3.3V/BATT	RTC (32.768KHz) CONNECTION
9	X32IN	I	3.3V/BATT	RTC (32.768KHz) CONNECTION
10	VSS		GND	GND
11	XBACEN	I	5V/BATT	BACKUP ENABLE
12	VDD (5V/B)		5V/BATT	POWER SOURCE (+5V/LITHIUM BATTERY)
13	XRAMCS	O	5V/BATT	RAM (IC504) CHIP SELECT
14	XRAMCS2	O	5V/BATT	-----
15	FTG	O	5V	SH SIGNAL OUTPUT FOR CIS

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
16	F1	O	5V	01 SIGNAL OUTPUT FOR CIS
17	F2/OP	O	5V	OUTPUT PORT (VOLOUTEN)
18	FR/OP	O	5V	OUTPUT PORT (RESERVED)
19	VIDRST/IOP	O	5V	OUTPUT PORT (PCTL)
20	SPHCLK/IOP	I	5V	INPUT PORT (PDET)
21	DARKON/IOP	I	5V	INPUT PORT (JOG1)
22	ADSEL2/IOP	I	5V	INPUT PORT (JOG2)
23	CPC	I	5V	INPUT PORT (T/P)
24	BELL	O	5V	OUTPUT PORT (LINE RLY)
25	VDD (5V)		5V	POWER SOURCE (+5V)
26	VSS		GND	POWER SOURCE (GND)
27	RVN	I	5V	INPUT PORT (FILM END SENS SIGNAL)
28	IRDATXD/IOP	O	5V	(CRESET)
29	IRDARXD/ IOP80	I	5V	INPUT PORT (MDL SEL)
30	TXD/IOP	O	5V	OUTPUT PORT (RESERVED)
31	RXD/IOP	O	5V	OUTPUT PORT (RESERVED)
32	XRTS/IOP	O	5V	OUTPUT PORT (RESERVED)
33	XCTS/IOP	O	5V	OUTPUT PORT (RESERVED)
34	XDSR/IOP	O	5V	OUTPUT PORT (RESERVED)
35	DCD/IOP	O	5V	OUTPUT PORT (RESERVED)
36	XDTR/IOP	O	5V	OUTPUT PORT (RESERVED)
37	RI/CLK/IOP	O	5V	-----
38	TONE1		5V	TONE OUTPUT
39	TONE2		5V	TONE OUTPUT
40	VOLUREF		5V	ANALOG REF VOLTAGE
41	VOLUOUT		5V	VOLUME OUTPUT
42	VOLUIN		5V	VOLUME INPUT
43	MIDAT/IOP	A	5V	MIDAT
44	MICLK/IOP	A	5V	MICLK
45	MILAT/IOP	A	5V	MILAT
46	XRESCS1	O	5V	OUTPUT PORT (BREAK)
47	IOP90	O	5V	OUTPUT PORT (SPMUTE)
48	VSS		GND	POWER SOURCE (GND)
49	VDD (5V)		5V	POWER SOURCE (+5V)
50	XNMI	I	5V	HIGH FIXED
51	CBUSY2	O	5V	CBUSY2
52	CSO	O	5V	CSO
53	CBUSY1	I	5V	CBUSY1
54	CCLK	I	5V	CIO
55	CSI	I	5V	CSI
56	IOP91	O	5V	INPUT PORT (VOX)
57	IOP92	O	5V	OUTPUT PORT (RESERVER)

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
58	FMEMCS/IOP	O	5V	OUTPUT PORT (FCS)
59	FMEMDO/IOP	O	5V	OUTPUT PORT (ALE)
60	FMEMDI/IOP	O	5V	OUTPUT PORT (CLE)
61	FMEMCLK/IOP	I	5V	INPUT PORT (R/B)
62	XRESCS3/OP	O	5V	OUTPUT PORT (OP RESET)
63	20KOSC/IOP	O	5V	RESERVED
64	XHOLDAK	O	5V	NOT USED
65	VDD (3.3V)		3.3V	POWER SOURCE (+3.3V)
66	XOUT	O	3.3V	SYSTEM CLOCK (24MHz)
67	XIN	I	3.3V	SYSTEM CLOCK (24MHz)
68	VSS		GND	POWER SOURCE (GND)
69	VDD (5V)		5V	POWER SOURCE (+5V)
70	XTEST	O	5V	24MHz CLOCK
71	CPUCLK	O	5V	NOT USED
72	TEST1	I	5V	HIGH FIXED
73	TEST2	I	5V	HIGH FIXED
74	TEST3	I	5V	HIGH FIXED
75	TEST4	I	5V	HIGH FIXED
76	XMDMINT	I	5V	MODEM INTERRUPT
77	XMDMCS	O	5V	MODEM CHIP SELECT
78	VSS		GND	POWER SOURCE (GND)
79	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
80	XWAIT	I	5V	LOW FIXED
81	HOLD	I	5V	LOW FIXED
82	HSTRD/IOP	O	5V	FLASH MEMORY READ
83	HSTWR/IOP	O	5V	FLASH MEMORY WRITE
84	XOPRBE	O	5V	NOT USED
85	ADR15	O	5V	CPU ADDRESS BUS 15 (NOT U)
86	ADR14	O	5V	CPU ADDRESS BUS 14 (NOT U)
87	ADR13	O	5V	CPU ADDRESS BUS 13 (NOT U)
88	XRAS/IOP	O	5V	DRAM (IC503) ROW ADDRESS STROBE
89	XCAS1/IOP	O	5V	DRAM (IC503) CULUM ADDRES STROBE
90	XCAS2/IOP	O	5V	OUTPUT PORT (MODRST)
91	VSS		GND	POWER SOURCE (GND)
92	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
93	XRESCS2	O	5V	OUTPUT PORT (CSBR)
94	DB3	I/O	5V	CPU DATA BUS 3
95	DB2	I/O	5V	CPU DATA BUS 2
96	DB4	I/O	5V	CPU DATA BUS 4
97	DB1	I/O	5V	CPU DATA BUS 1
98	DB5	I/O	5V	CPU DATA BUS 5
99	DB0	I/O	5V	CPU DATA BUS 0

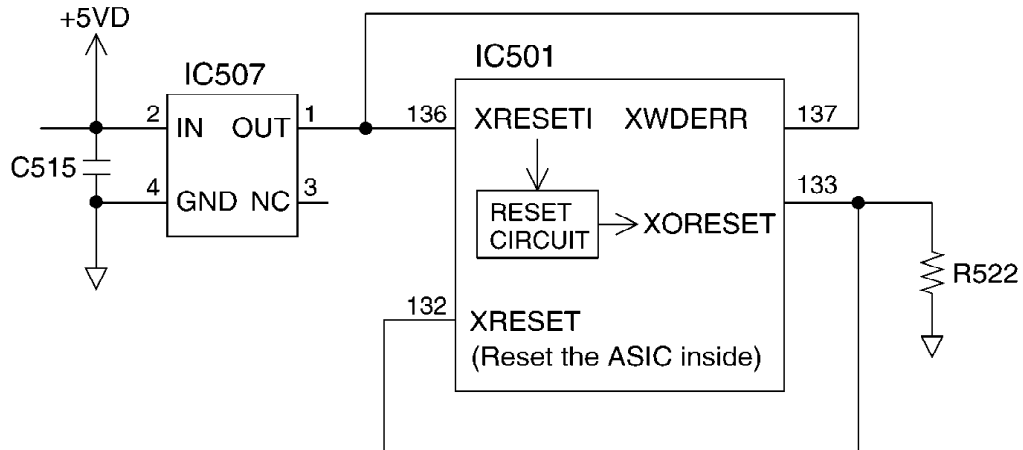
NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
100	DB6	I/O	5V	CPU DATA BUS 6
101	DB7	I/O	5V	CPU DATA BUS 7
102	VSS		GND	POWER SOURCE (GND)
103	VDD (5V)		5V	POWER SOURCE (5V)
104	XROMCS	I/O	5V	ROM (IC502) CHIP SELECT
105	RD	O	5V	CPU RD
106	WR	O	5V	CPU WR
107	ADR0	O	5V	CPU ADDRESS BUS 0
108	ADR1	O	5V	CPU ADDRESS BUS 1
109	ADR2	O	5V	CPU ADDRESS BUS 2
110	ADR3	O	5V	CPU ADDRESS BUS 3
111	ADR4	O	5V	CPU ADDRESS BUS 4
112	ADR5	O	5V	CPU ADDRESS BUS 5
113	ADR6	O	5V	CPU ADDRESS BUS 6
114	ADR7	O	5V	CPU ADDRESS BUS 7
115	ADR8	O	5V	CPU ADDRESS BUS 8
116	ADR9	O	5V	CPU ADDRESS 9
117	ADR10	O	5V	CPU ADDRESS 10
118	ADR11	O	5V	CPU ADDRESS 11
119	ADR12	O	5V	CPU ADDRESS 12
120	VSS		GND	POWER SOURCE (GND)
121	VDD (5V)		5V	POWER SOURCE (+5V)
122	RBA0	O	5V	ROM/RAM BANK ADDRESS 0
123	RBA1	O	5V	ROM/RAM BANK ADDRESS 1
124	RBA2	O	5V	ROM/RAM BANK ADDRESS 2
125	RBA3	O	5V	ROM/RAM BANK ADDRESS 3
126	RBA4	O	5V	ROM/RAM BANK ADDRESS 4
127	RBA5	O	5V	ROM/RAM BANK ADDRESS 5
128	RBA6/IOP96	O	5V	OUTPUT PORT (S/ENB)
129	IOP95	O	5V	OUTPUT PORT (SEN LED ON)
130	IOP94	O	5V	OUTPUT PORT (RESERVER)
131	IOP93	I	5V	OUTPUT PORT (CIS LED ON)
132	XRESET	I	5V	RESET INPUT
133	XORESET	O	5V	RESET OUTPUT
134	VDD (5V)		5V	POWER SOURCE (+5V)
135	VSS		GND	POWER SOURCE (GND)
136	XRESETI	I	5V	RESET INPUT
137	WDERR	O	5V	WATCHED ERROR OUTPUT SIGNAL
138	XRSTSWI	I	5V	INPUT PORT (MPOS)
139	XRSTSWO	O	5V	OUTPUT PORT (VOLIN SEL2)
140	XRESETO	O	5V	NOT USED
141	IOP	O	5V	THERMAL HEAD POWER ON/OFF CONTROL

NO.	SIGNAL	I/O	POWER SUPPLIED VOLTAGE	DESCRIPTION
142	STB1	O	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
143	STB2	O	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
144	VDD (3.3V)		3.3V	POWER SOURCE (3.3V)
145	VSS		GND	POWER SOURCE (GND)
146	STB3	O	5V	STROBE SIGNAL OUTPUT TO THERMAL HEAD
147	STB4	O	5V	NOT USED
148	STBNP	I	5V	INPUT PORT (CPC)
149	THDAT	O	5V	RECORDED IMAGE OUTPUT
150	THCLK	O	5V	CLOCK OUTPUT FOR DATA TRANSFER
151	THLAT	O	5V	PULSE OUTPUT FOR DATA LA
152	RM0/IOP	I	5V	INPUT PORT (P-TOP)
153	RM1/IOP	I	5V	INPUT PORT (DCN)
154	RM2/IOP	I	5V	INPUT PORT (CPC)
155	RM3/IOP	O	5V	OUTPUT PORT (VOLIN SEL1)
156	RXE/IOP	I	5V	INPUT PORT (NOT USED)
157	TMO	O	5V	MOTOR A PHASE
158	VDD (5V)		5V	POWER SOURCE (+5V)
159	VSS		GND	POWER SOURCE (GND)
160	TM1/IOP	O	5V	MOTOR B PHASE
161	TM2/IOP	O	5V	MOTOR /A PHASE
162	TM3/IOP	O	5V	MOTOR /B PHASE
163	TXE/IOP	O	5V	MOTOR ENABLE SIGNAL
164	KSTART	O	5V	OPERATION PANEL CONTROL
165	KLATCH	O	5V	OPERATION PANEL CONTROL
166	KSCLK	O	5V	OPERATION PANEL CONTROL
167	KTXD	O	5V	OPERATION PANEL CONTROL
168	KRXD	I	5V	OPERATION PANEL CONTROL
169	ADSEL1	O	5V	CHANNEL SELECT SIGNAL FO AIN2
170	VSSC		GND	POWER SOURCE (ANALOG GN
171	VDDC		3.3V	POWER SOURCE (ANALOG +3.
172	VSSA		GND	POWER SOURCE (ANALOG GN
173	VDDA		3.3V	POWER SOURCE (ANALOG +3.
174	VREFB	A	3.3V	A/D CONVERTER'S ZERO STANDARD VOLTAGE OUTPUT
175	VCL	A	3.3V	ANALOG PART STANDARD VOLTAGE SIGNAL
176	VREFT	A	3.3V	A/D CONVERTER'S FULL SCAL VOLTAGE OUTPUT

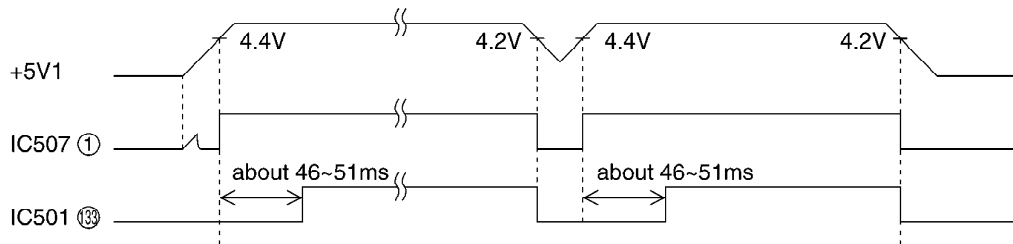
6.3.7. RESET CIRCUIT (WATCH DOG TIMER)

The output signal from pin 1 of the voltage detect IC (IC507) is input to the ASIC (IC501) 136 pin. Then the output signal from pin 133 of the ASIC (IC501) resets the ASIC.

Circuit Diagram



1. During a momentary power interruption, a positive reset pulse of 46~51 msec is generated and the system is reset completely.



2. When pin 132 and 133 of IC501 become low level, they will prohibit the SRAM (IC503) from changing data.
The SRAM (IC504) will go into the backup mode, when they are backed up by a lithium battery.
3. The watch dog timer, built-in the ASIC (IC501), is initialized by the CPU about every 1.5 ms.
When a watch dog error occurs, pin 137 of the ASIC (IC501) becomes low level.
The terminal of the WDERR signal is connected to the reset line, so the WDERR signal works as the reset signal.

6.3.8. SRAM AND RTC BACKUP CIRCUIT

1. Function

This unit has a lithium battery (BAT501) which works for the

SRAM (IC504) and Real Time Clock IC (RTC: inside IC501).

The user parameters for autodial numbers, the system setup data and others are stored in the SRAM (IC504).

The RTC continues to work, backed up by a lithium battery even when the power switch is OFF.

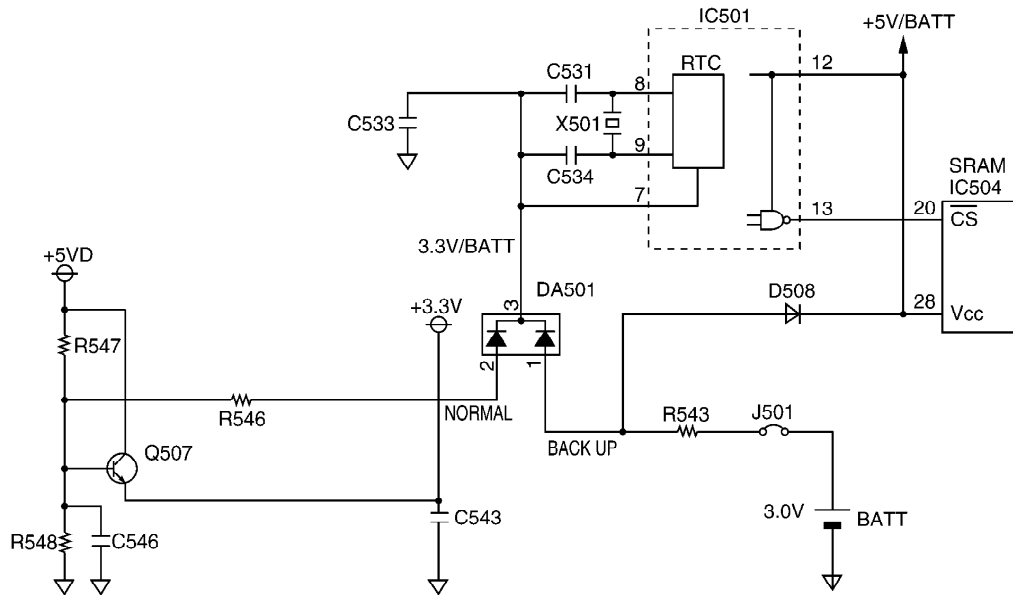
2. SRAM (IC504) Backup Circuit Operation

When the power switch is turned ON, power is supplied through pin 12 of IC501 to the SRAM (IC504). At this time, the voltage at pin 28 of the SRAM is 5V. When the power switch is turned OFF, the BATT supplies power to the SRAM through J501, R543 and D508. The voltage at pin 28 of the SRAM is about +2.5V. When the power switch is OFF and the voltage of +5V decreases, the voltage detect IC (IC507) outputs "Low " level and the IC501 outputs the reset signal. Pin 28 of the SRAM becomes roughly the same voltage as the battery voltage. At this point, pin 20 (CS) of IC504 becomes high level, causing the SRAM to go into the backup mode, in which the power consumption is lower.

3. RTC Inside (IC501) Backup Circuit Operation

When the power switch is turned ON, power is supplied through DA501 to the RTC (inside IC501). At this time, the voltage at pin 7 of the IC501 is +3.3V. When the power switch is turned OFF, the BATT supplies power to RTC through DA501. The voltage at pin 7 of IC501 is about +2.5V. When the power switch is OFF and the voltage of +3.3V decreases, pin 7 of RTC (IC501) becomes roughly the same voltage as the battery voltage. RTC goes into the backup mode, in which the power consumption is lower.

Circuit Diagram



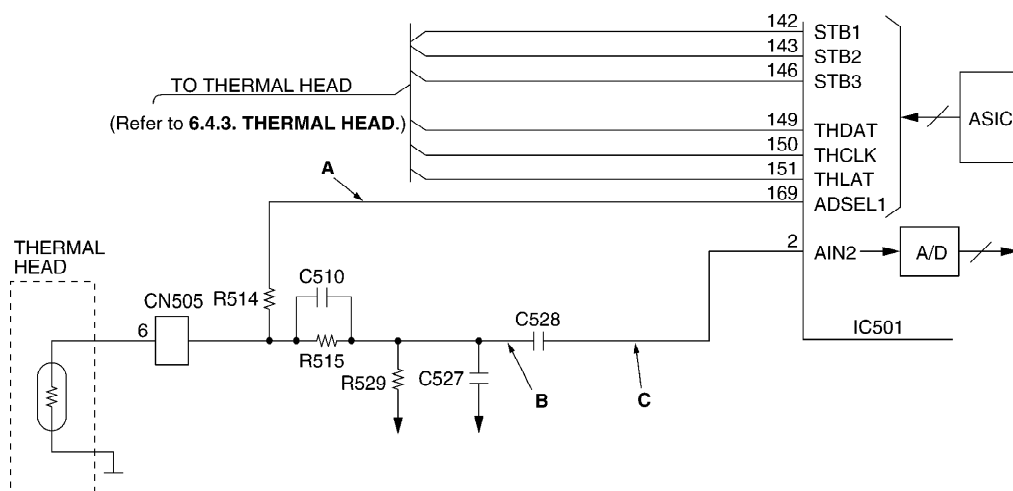
6.3.9. SUPERVISION CIRCUIT FOR THE THERMAL HEAD TEMPERATURE

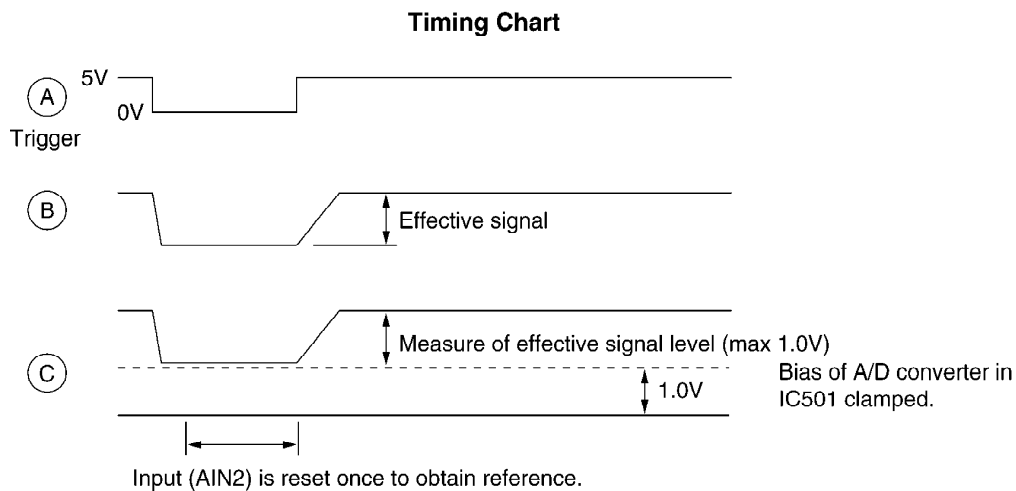
1. Function

The thermistor changes the resistor according to the temperature and uses the thermistor's characteristics. The output of pin 169 of IC501 becomes a low level. Then when it becomes a high level, it triggers point A. In point C, according to the voltage output time, the thermal head's temperature is detected.

After the thermal head temperature is converted to voltage in B, it is then changed to digital data in the A/D converter inside IC501. The CPU decides the strobe width of the thermal head according to this value. Therefore, this circuit can keep the thermal head at an even temperature in order to stabilize the printing density and prevent the head from being overheated.

Circuit Diagram





CROSS REFERENCE:

THERMAL HEAD()

6.4. FACSIMILE SECTION

6.4.1. IMAGE DATA FLOW DURING FACSIMILE OPERATION

COPY (Fine, Super-Fine, Half Tone)

- 1. Line information is read by CIS (to be used as the reference white level) via route 1, and is input to IC501. Refer to 6.4.2. Block Diagram.**
- 2. In IC501, the data is adjusted to a suitable level for A/D conversion in the Analog Signal Processing Section, and via route 2, it is input to A/D conversion (8 bit). After finishing A/D conversion, the data is input to the Image Processing Section via route 3. Then via routes 4 and 5, it is stored in RAM as shading data.**
- 3. The draft's information that is read by CIS is input to IC501 via route 1. After it is adjusted to a suitable level for A/D conversion via route 2, the draft's information is converted to A/D (8 bit), and it is input to the Image Processing Section. The other side, the shading data which flows from RAM via routes 6 and 7, is input to the Image Processing Section. After finishing the draft's information image processing, white is regarded as "0" and black is regarded as "1". Then via routes 4 and 5, they are stored in RAM.**

4. The white/black data stored as above via routes 6 and 8 is input to the P/S converter. The white/black data converted to serial data in the P/S converter is input to the Thermal Head via route 9 and is printed out on recording paper.

Note:

Standard : Reads 3.58 times/mm

Fine : Reads 7.7 times/mm

Super-Fine : Reads 15.4 times/mm

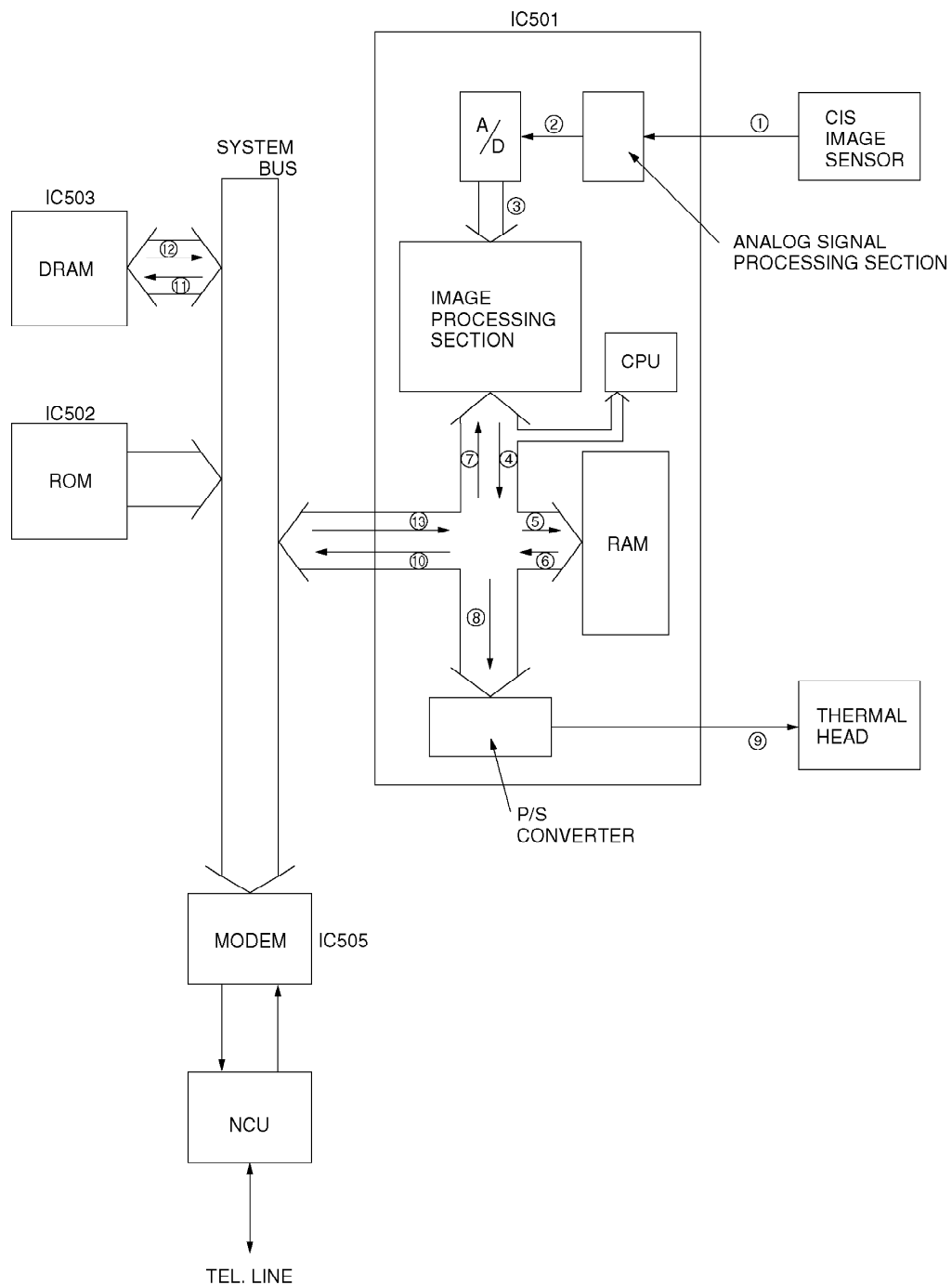
Transmission

1. Same processing as COPY items 1 - 3.
2. The data stored in the RAM of IC501 is output from IC501 via routes 6 and 10, and is stored in the system bus.
Via route 11, it is stored in the communication buffer inside DRAM (IC503).
3. While retrieving data stored in the communication buffer synchronous with the modem, the CPU (inside IC501) inputs the data to the modem along route 12, where it is converted to serial analog data and forwarded over the telephone lines via the NCU Section.

Reception

1. The serial analog image data is received over the telephone lines and input to the modem via the NCU section, where it is demodulated to parallel digital data. Then the CPU (IC501) stores the data in the communication buffer DRAM (IC503) along route 12.
2. The data stored in DRAM (IC503) is decoded by the CPU (IC501) via route 12, and is stored in DRAM (IC503) via routes 13 and 5.
3. Same processing as COPY item 4.

6.4.2. BLOCK DIAGRAM



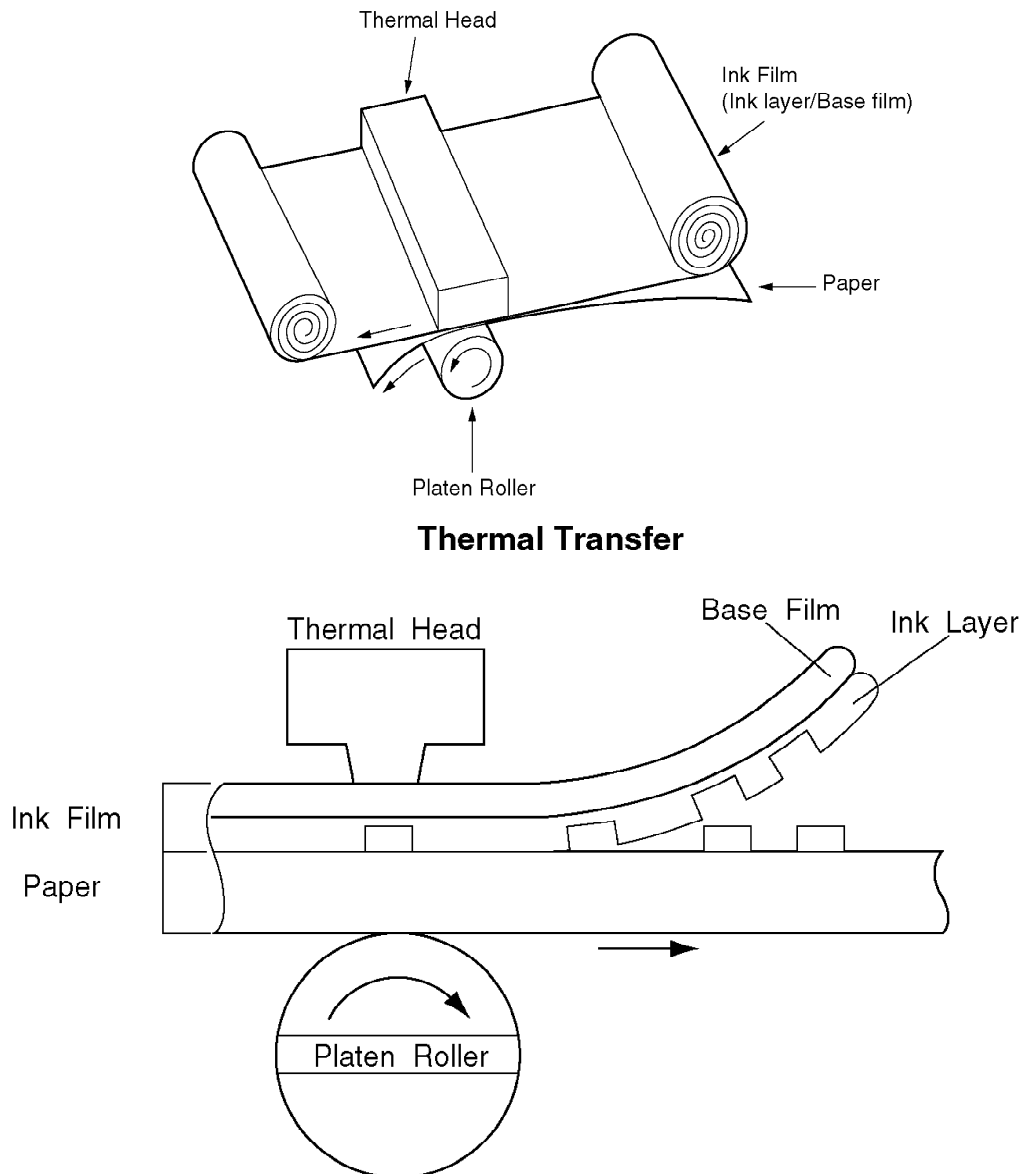
6.4.3. THERMAL HEAD

1. Function

This unit utilizes the state of the art thermal printer technology. The ink film is chemically processed. The ink film is comprised of two parts: an ink layer and a base film. When the thermalhead contacts this ink film, it emits heat momentarily, and the ink layer is melted and transferred to the paper. If this continues, letters and

/or diagrams appear, and the original document is reproduced.

COMPOSITION OF THE RECEIVE RECORD SECTION (THERMAL RECORDING FORMAT)



2. Circuit Operation

Refer to the block diagram and the timing chart on the following page.

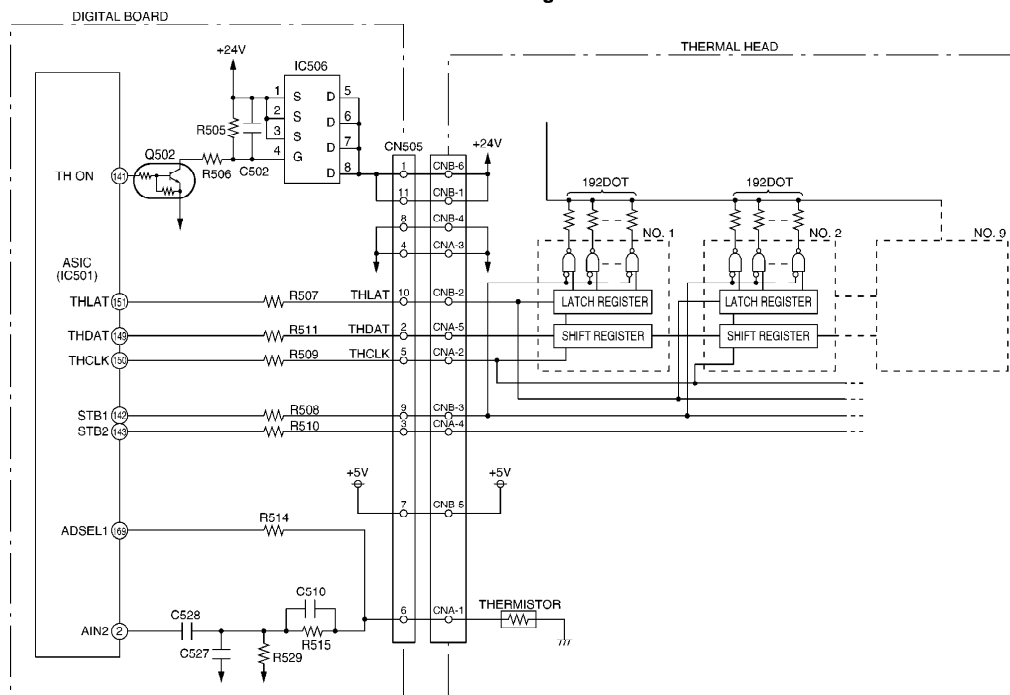
There are 9 driver ICs aligned horizontally on the thermal head and each one of these ICs can drive 192 heat-emitting registers. This means that one line is at a density of $192 \times 9 = 1728$ dots = (8 dots/mm).

White/Black (white=0, black=1) data in one line increment is synchronized at IC501 pin 150 (THCLK), and sent from IC501 pin

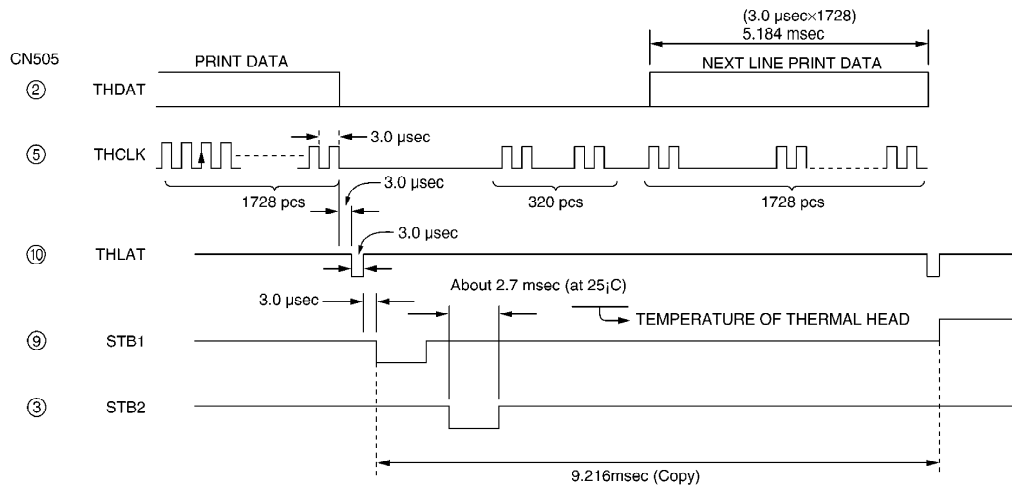
149 (THDAT) to the shift register of the ICs. The shift registers of the 9 ICs are connected in series, and upon the shift of the 1728 dot increment, the shift register becomes filled with data, and a latch pulse is emitted to each IC from IC501 pin 151 (THLAT). With this latch pulse, all the contents of the shift registers are latched to the latch registers. Thereafter, through the addition of strobes from the IC501 pins (142, 143), only the dot location of black (=1) among latched data activates the driver, and the current passes to heat the emitting body to cause heat emission. Here, the two line strobes, STB1 to STB2, impress at intervals of 9.216 msec, as required for one-line printout. The sequence is shown on the next page. [Moreover, for the strobe width, the thermistor value inside the thermal head is detected according to IC501 pin 2. Depending on that value, the strobe width is recorded in ROM (IC502). Accordingly, the strobe width is determined.]

When the thermal head is not used, the IC501 (141, THON) becomes low, Q502 turns OFF, IC506 turns OFF, and the +24V power supply for the thermal head driver is not impressed to protect the IC.

Circuit Diagram



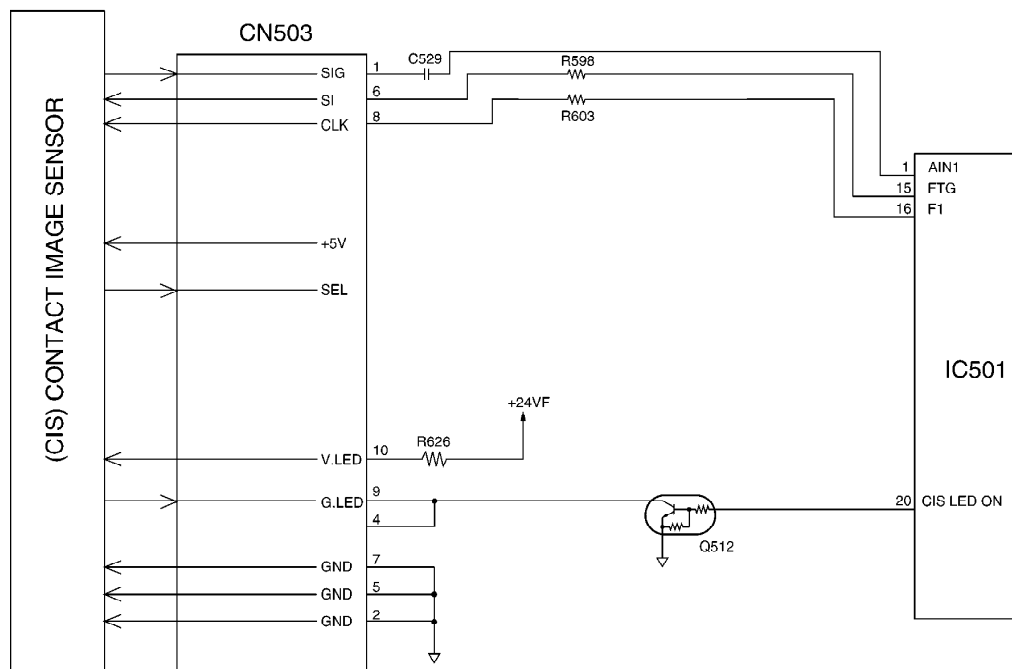
Timing Chart



6.4.4. SCANNING BLOCK

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.

Circuit Diagram



When an original document is inserted and the start button pressed, pin 20 of IC501 goes to a high level and the transistor Q512 turns on. This applies voltage to the LED array to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC501, and the original image illuminated by the LED array undergoes photoelectric conversion to output an analog image signal (SIG). The analog image signal is input to the system LSI on AIN1 (pin 1 of IC501) and converted into 8-bit data by the A/D converter inside IC501. Then this signal undergoes digital processing in order to obtain a high-quality image.

6.4.5. STEPPING MOTOR DRIVE CIRCUIT

1. Function

The stepping motor works for both transmission and reception.

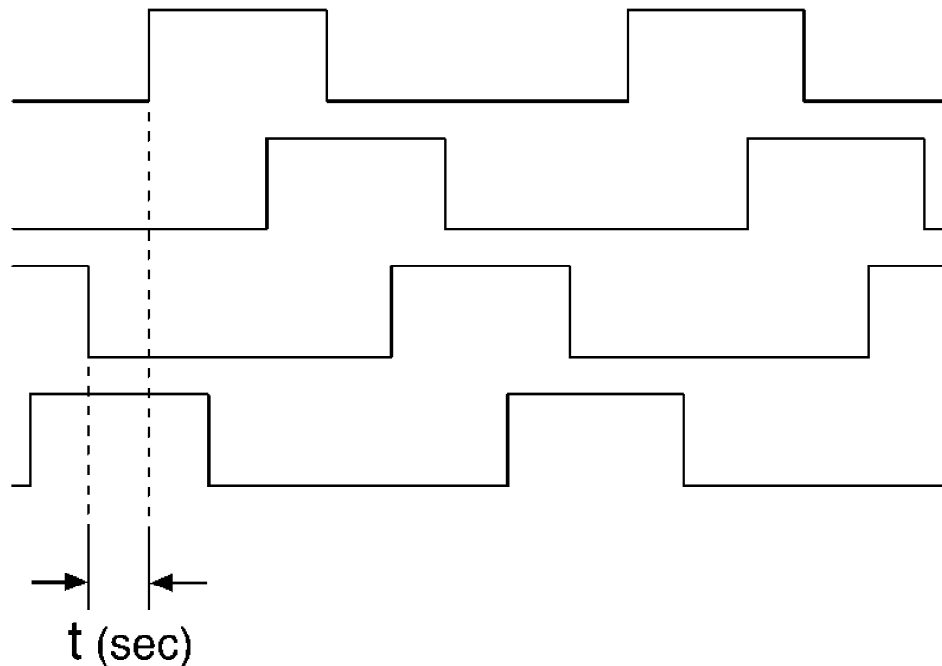
2. Motor

During motor driving, pin 163 of ASIC IC501 becomes a high level, and Q503, Q501 turns on. As a result, +24V is supplied to the motor coil.

Stepping pulses are output from gate array IC501 pins, 157, 160~162, causing driver IC506 pins, 16~13 to drive the motor coil. The motor coil is energized sequentially in 2 phase increments, which causes a 1-step rotation. A 1-step rotation feeds 0.13 mm of recording paper or document paper.

Stepping Monitor Timing Chart

• 1-2 Phase



Stepping Motor Drive Mode

Function	Mode	Phase Pattern	Speed
Copy	Standard or Fine	1-2	432 pps ($t=1/432$)
	Super Fine	1-2	216 pps ($t=1/216$)
Paper Feed	——	1-2	432 pps ($t=1/432$)
Stand-by	——	All phases are currently off.	None

[illegible]

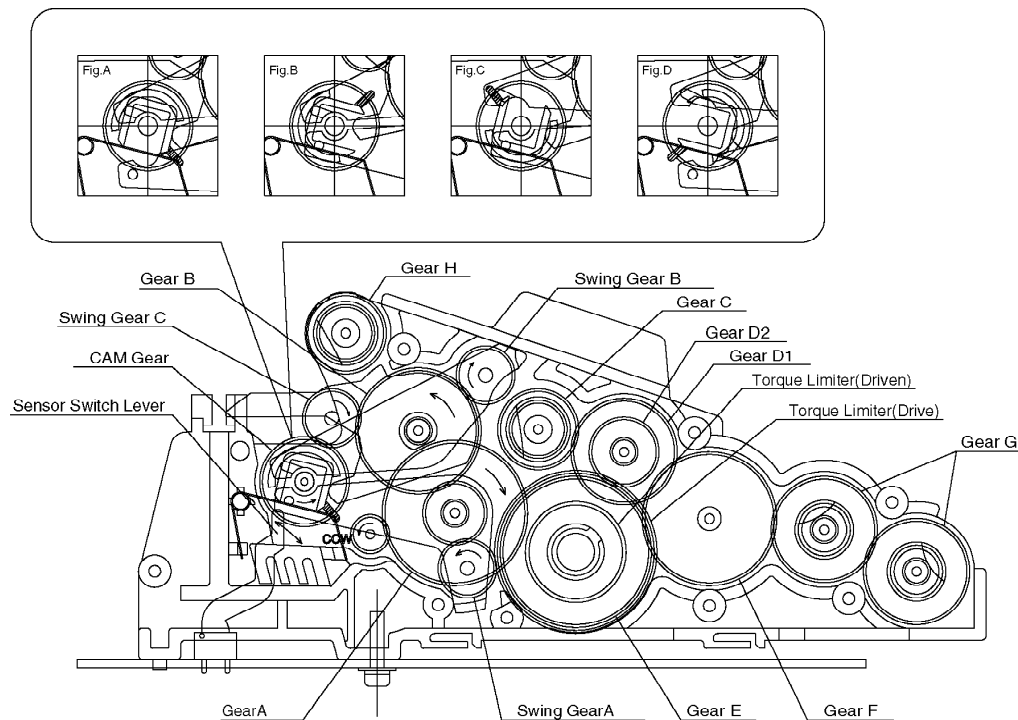
6.4.6. GEAR SECTION

6.4.6.1. MODE SELECTION (See Fig. 1)

(Ex. If the Mode Marker is in position A, a transmit mode is selected.)

The arrows show the directions in which the active gears turn around.

184



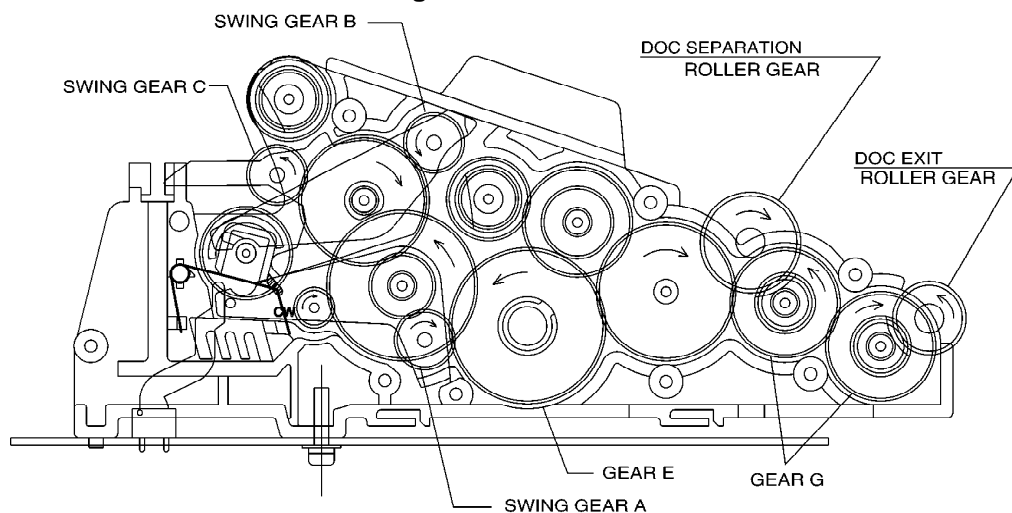
6.4.6.2. MODE OPERATION

Once a mode is selected, the Drive Motor Gear rotates clockwise (CW) and then the controlling positions of Swing Gears A, B and C determine which gears convey their drive power in each mode.

A. Transmit mode (See Fig. A.) :

Swing Gear A engages Gear E and conveys its power to the Separation Roller Gear through Gear G and sets the Separation Roller for feeding documents.

Fig. A: Transmit mode

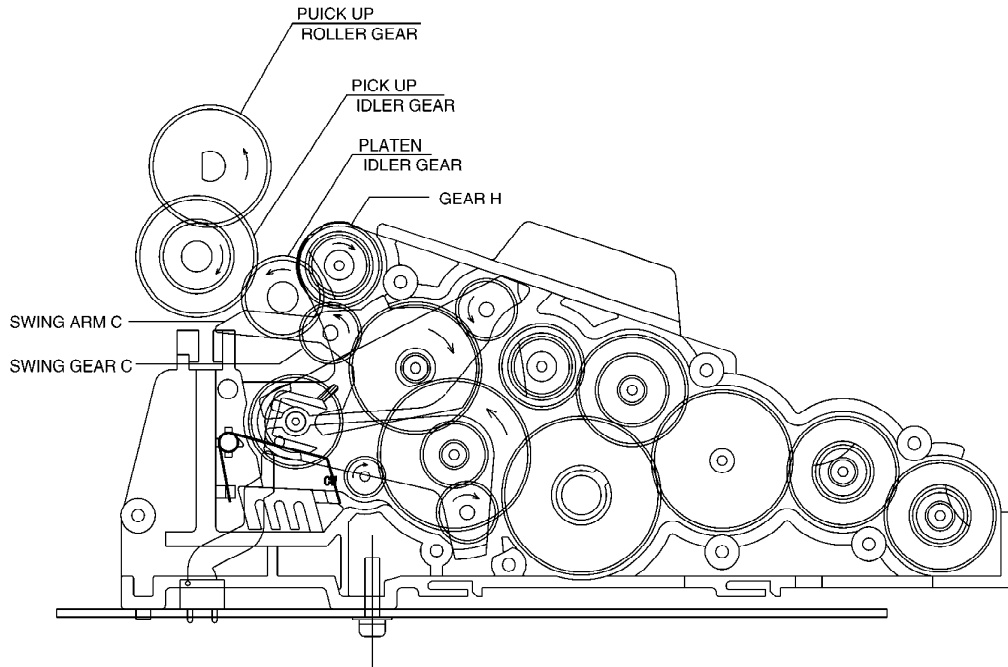


B. Paper-Pickup mode (See Fig. B) :

Swing Gear C engages Gear H and provides its power to the Pick up Roller Gear and Platen

Idler Gear and Pick up Idler Gear. The Gear drive as follows: Swing Arm C → engaging → Gear H → Platen Idler Gear → Pick up Idler Gear → Pickup roller Gear. The Pickup Roller picks up and pre-feeds a recording paper until the recording paper pushes up the Paper Top sensor* lever.

Fig. B: Paper-Pickup mode



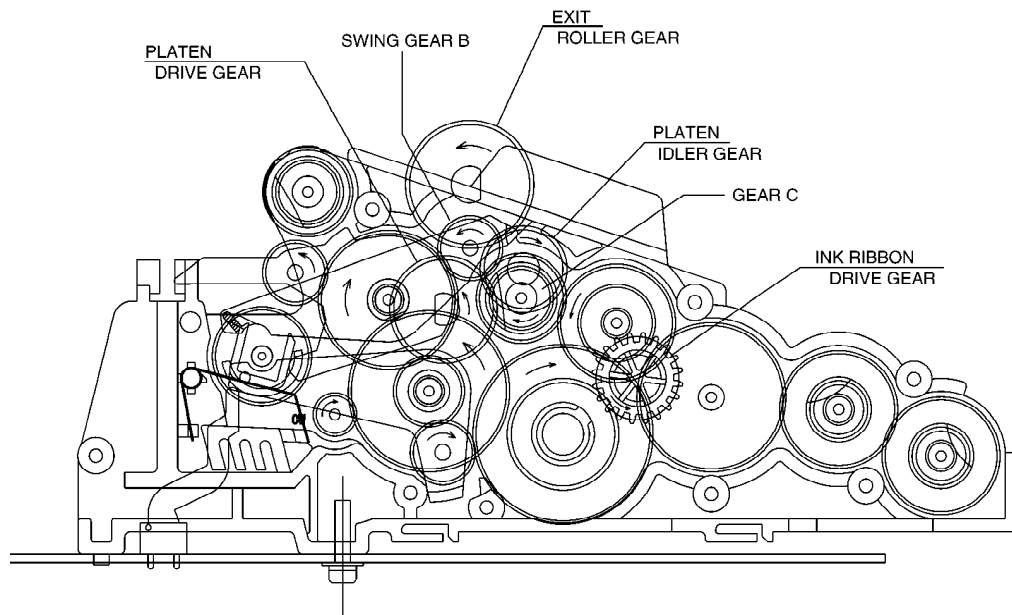
Note* :

See "Sensor Location" in **SENSORS AND SWITCHES()**.

C. Receive mode (See Fig. C.) :

After paper pick up mode, Swing Gear B engages Gear C and conveys its power to the Platen Roller Gear and Ink Ribbon Drive Gear through Platen Drive Gear. Then, the Platen Roller feeds recording paper for printing the received data.

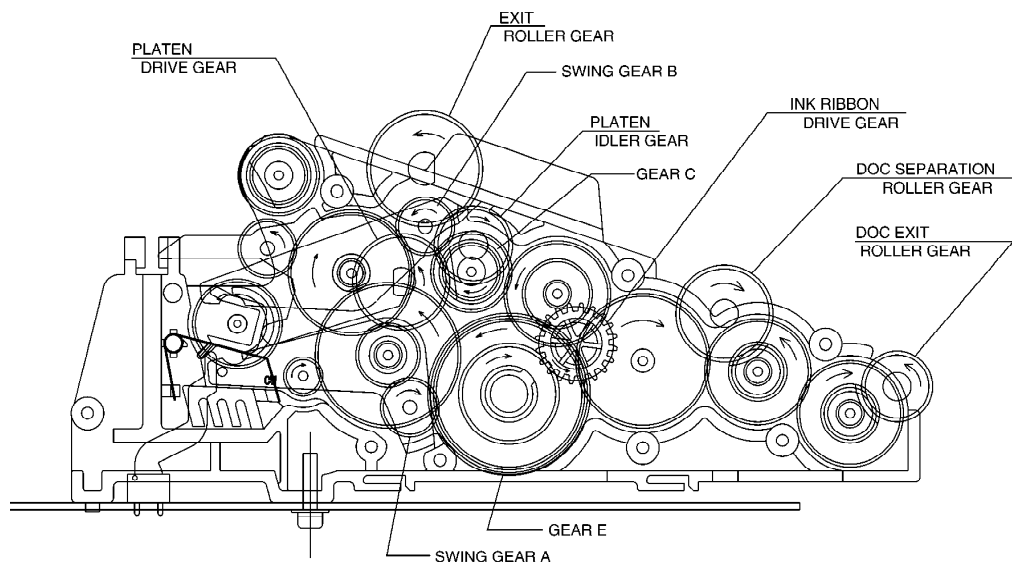
Fig. C: Receive mode



D. Copy mode (See Fig. D.) :

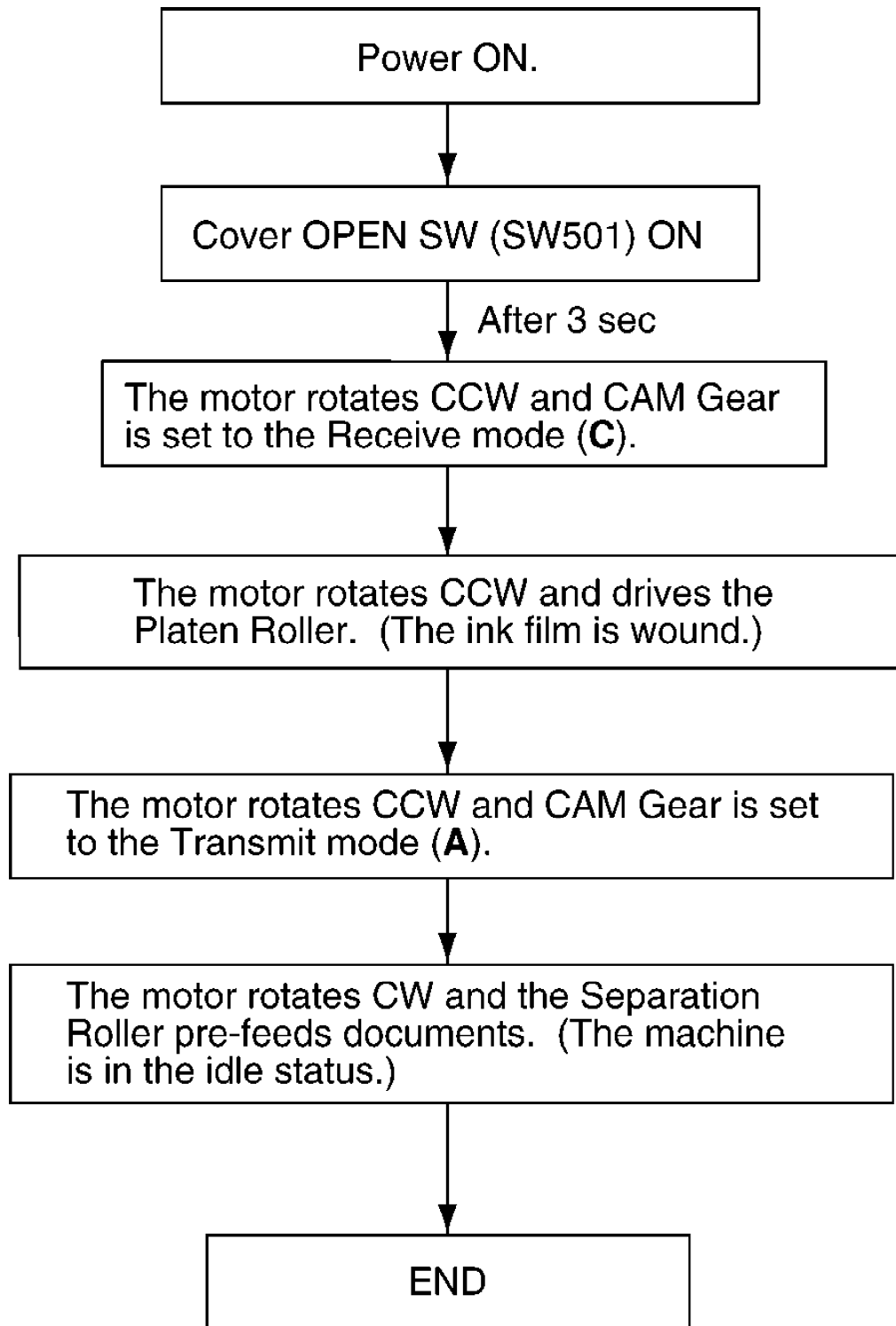
Documents pre-feeding → Transmit mode go → Recording paper feeding → Pick up mode go.
 Next Swing Gear A and B engages Gear E and Gear C respectively and conveys these power to the Separation Roller Gear and the Platen Roller Gear. Then the Separation Roller feeds documents and the Platen Roller feeds recording paper for printing copier data.

Fig. D: Copy mode



6.4.6.3. MECHANICAL MOVEMENTS IN THE MAIN OPERATIONS (transmitting documents, receiving faxes and copying)

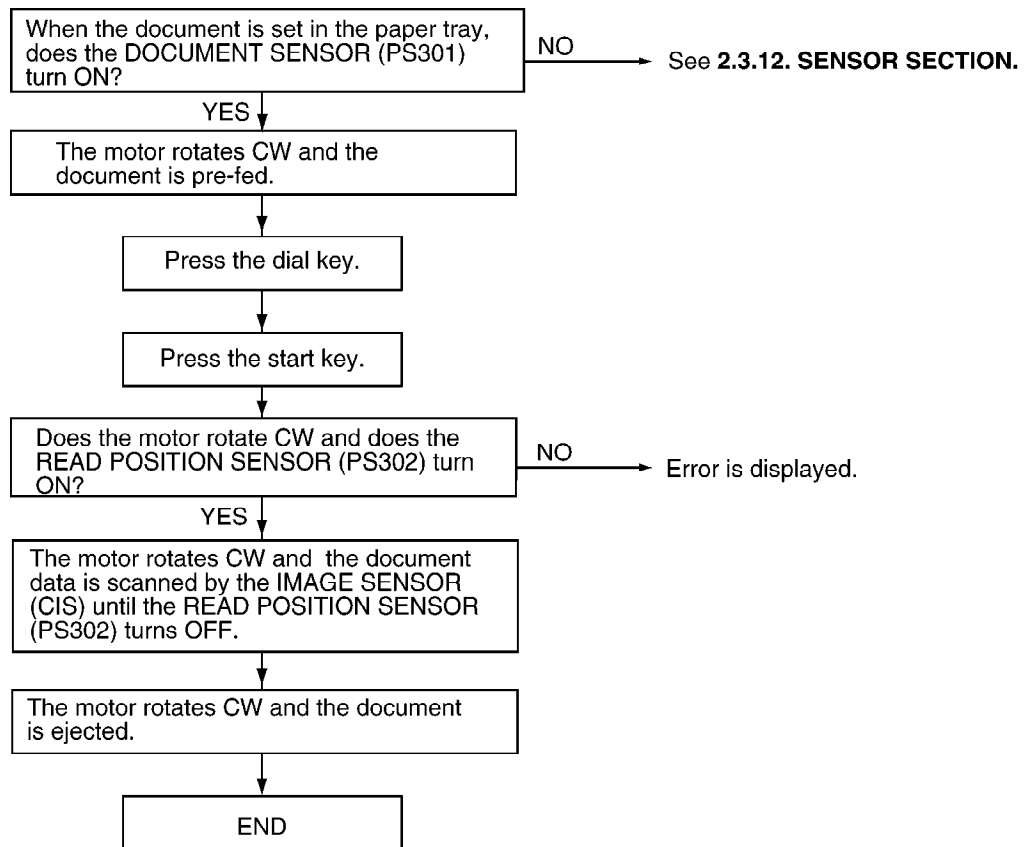
6.4.6.3.1. IDLE STATUS



Note:

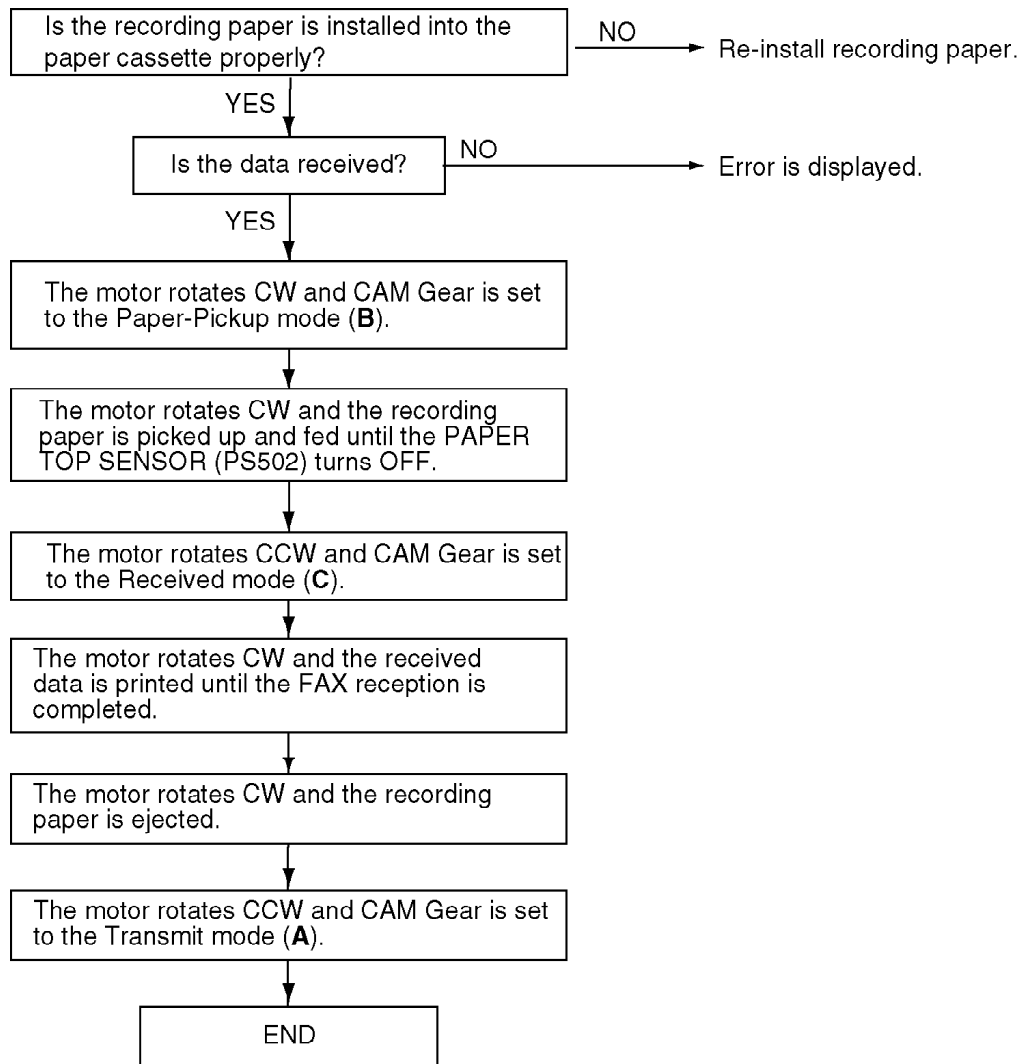
See “Sensor Locations” in **SENSORS AND SWITCHES()**.

6.4.6.3.2. TRANSMITTING DOCUMENTS



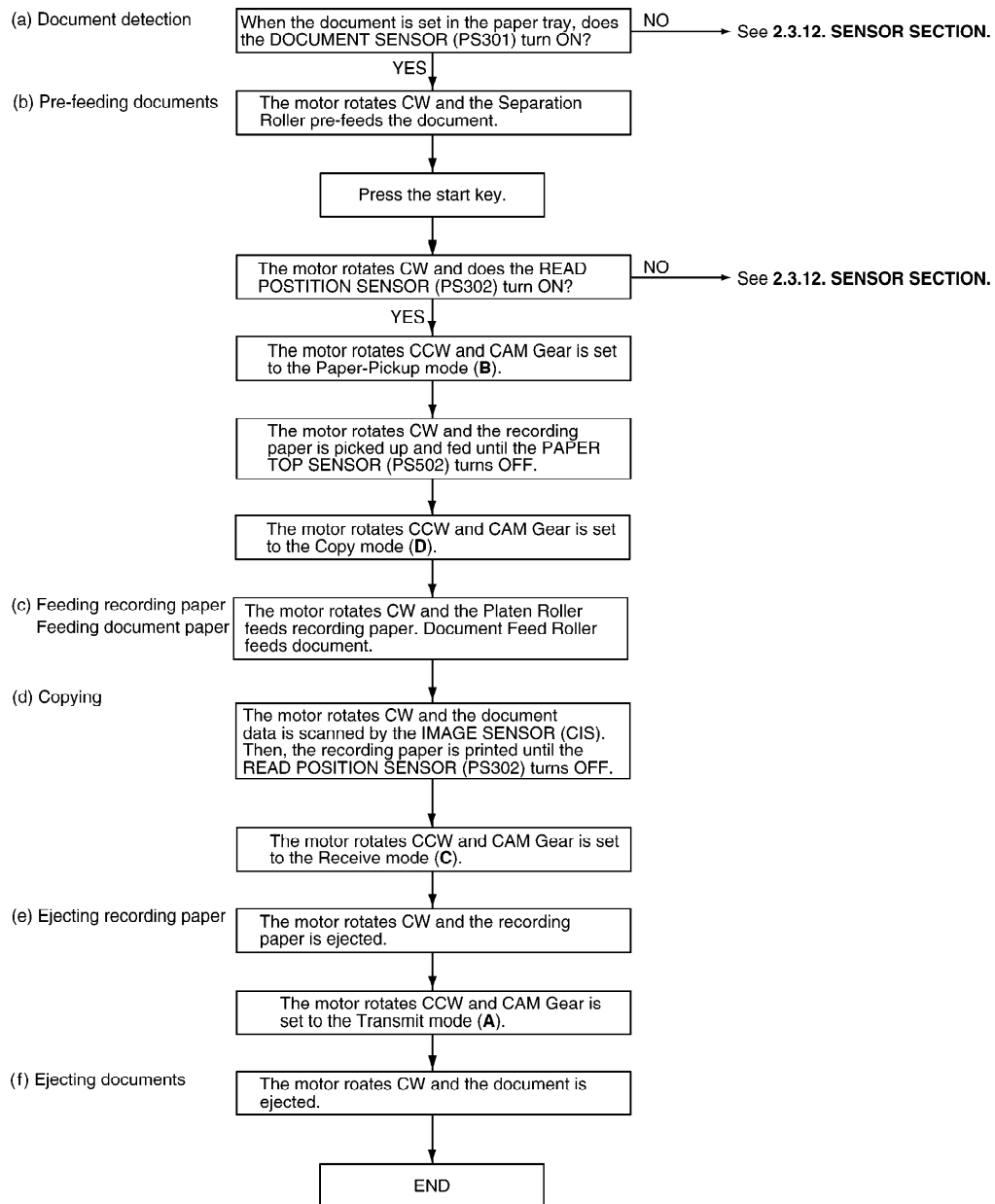
CROSS REFERENCE:
SENSOR SECTION().

6.4.6.3.3. RECEIVING FAX



Note:

See “Sensor Locations” in SENSORS AND SWITCHES().
6.4.6.3.4. COPYING



Note:

See “Sensor Locations” in **SENSORS AND SWITCHES()**.

CROSS REFERENCE:

SENSOR SECTION()

6.5. SENSORS AND SWITCHES

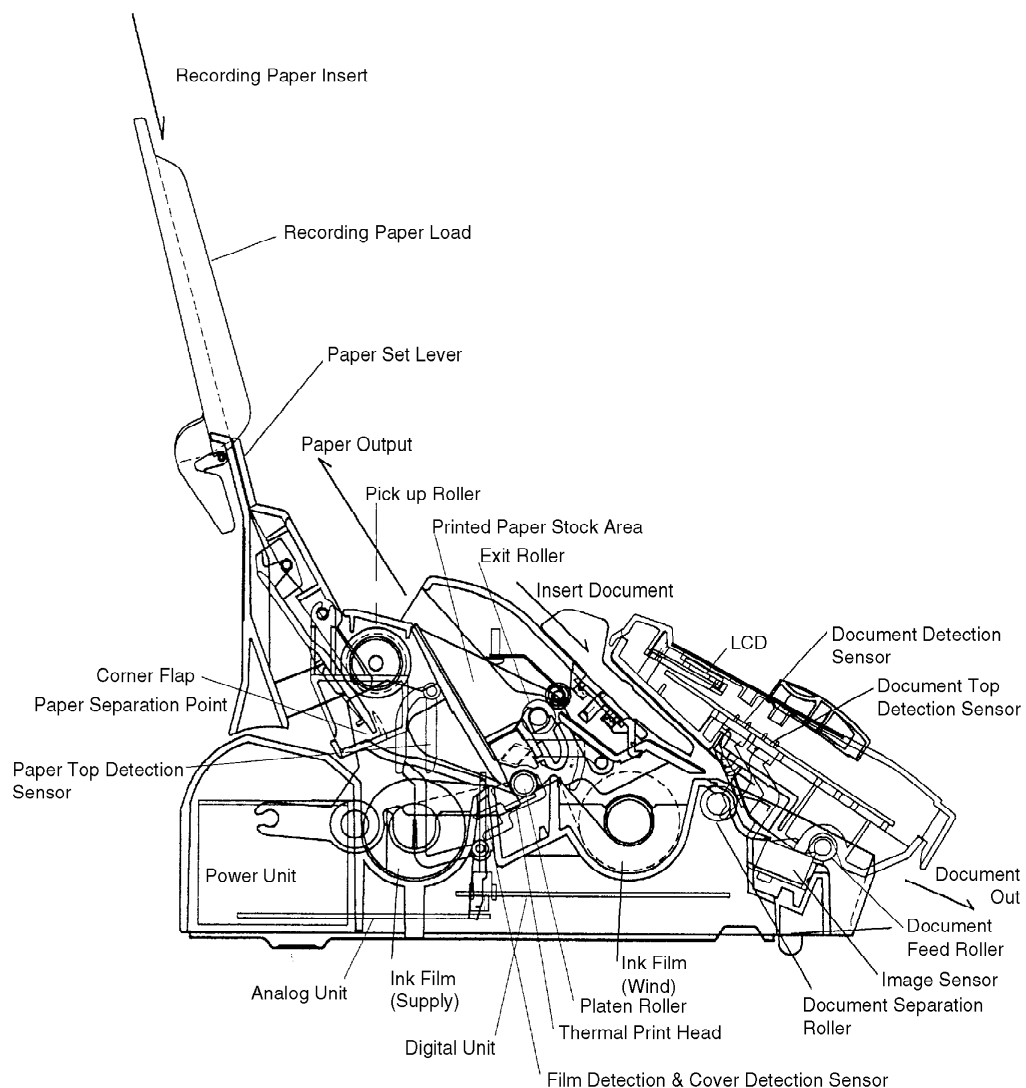
All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Operation Panel	SW352	Document set SW	[CHECK DOCUMENT]
	SW353	Document top SW	[REMOVE DOCUMENT]
Digital PCB	SW501	Film End/Cover open	[CHECK COVER] or [CHECK FILM]
	PS501	Paper Top	[PAPER JAMMED]
Analog P.C.B	SW102	Motor Position	_____
	SW101	Hook	_____

Note:

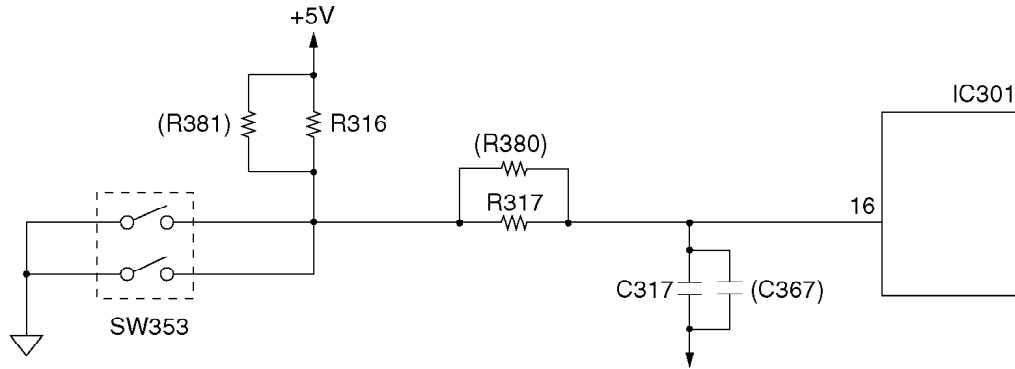
See **TEST FUNCTIONS()**. (#815: Sensor Check)

Sensor Locations



1. [Document top SW (SW353)]

When a document is brought to the read position, the SW becomes ON, and the input signal of IC301-16 pin (Operation) becomes a low level. When there is no document at the read position, the SW becomes OFF, and the input signal of IC301-16 pin (Operation) becomes a high level.

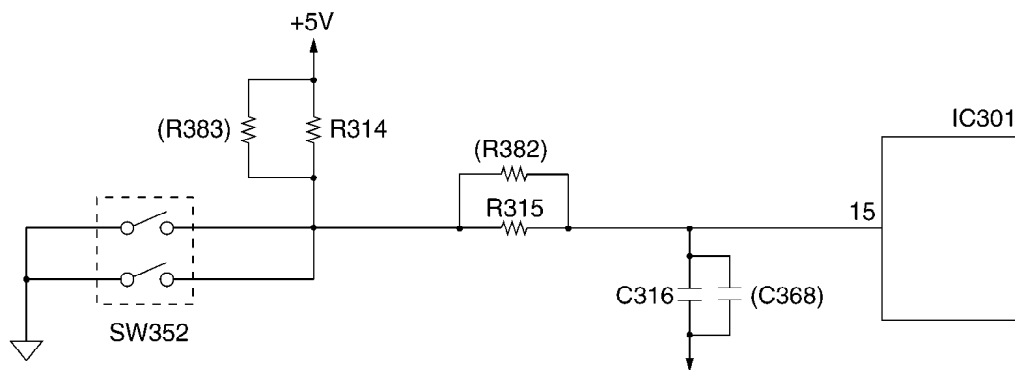


Operation Board

	Photo transistor	Signal (IC301-16 pin)
Out of the Read Position	OFF	High level
At the Read Position	ON	Low level

2. [Document Set (SW352)]

When a document is set, the SW becomes ON, and the input signal of IC301-15 pin (Operation) becomes a low level. When there is no document, the SW becomes ON, and the input signal of IC301-15 pin (Operation) becomes a high level.

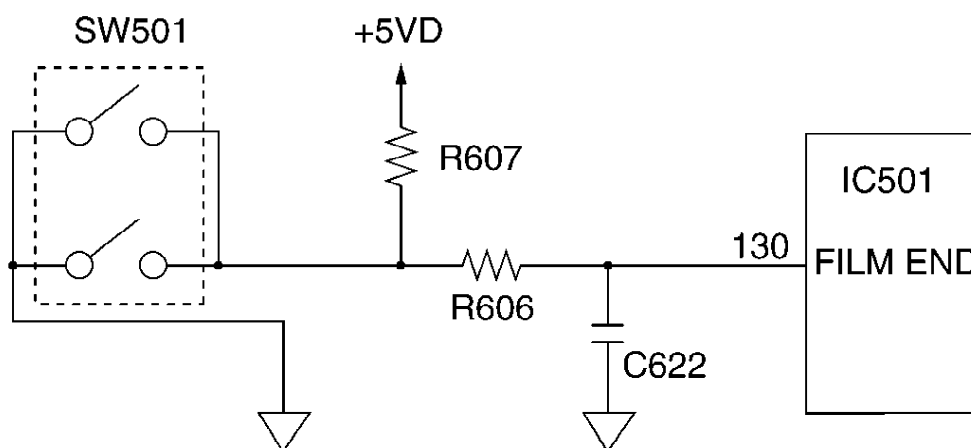


Operation Board

	Photo transistor	Signal (IC301-15 pin)
No document	OFF	High level
Set document	ON	Low level

3. [Cover Open/Film End SW (SW501)]

When the operation panel cover is closed and a film is set, the SW becomes ON, and the input signal of IC501-130 pin (Digital) becomes a low level. When the cover is opened, the SW becomes OFF, and the input signal of IC501-130 pin (Digital) becomes a high level.



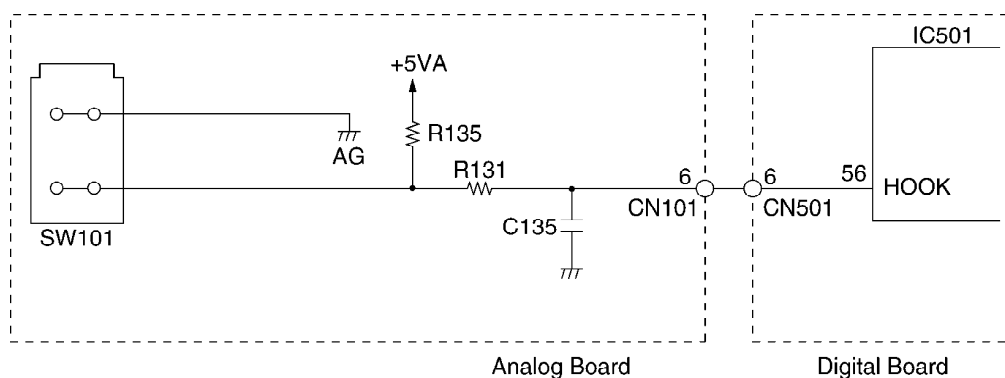
Digital Board

	Photo transistor	Signal (IC501-130 pin)
Cover open or no film	OFF	High level
Cover closed and set a film	ON	Low level

4. [Hook Switch (SW101)]

When the handset is lifted, the switch turns ON, and the signal at pin 56 of IC501 becomes low.

When the handset is returned, the switch turns OFF, and the signal at pin 56 of IC501 becomes high.



Digital Board

	SW	Signal (IC501-56 pin)
ON-Hook	OFF	High level
OFF-Hook	ON	Low level

5. [Paper top Sensor (PS501)]

When the recording paper is loaded on the print head, the shelter plate shuts the sensor light, and the photo transistor becomes OFF. The input signal of IC501-131 pin becomes a high level. Usually, the shelter plate is lifted, the photo transistor becomes ON, and the input signal of IC501-131 pin becomes a low level.

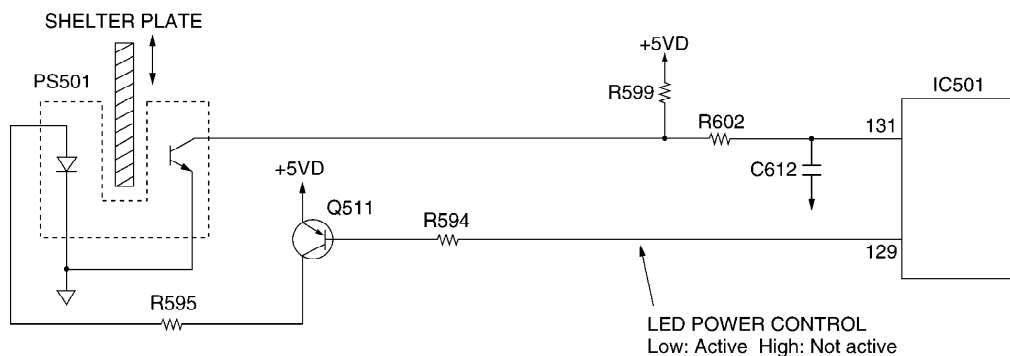
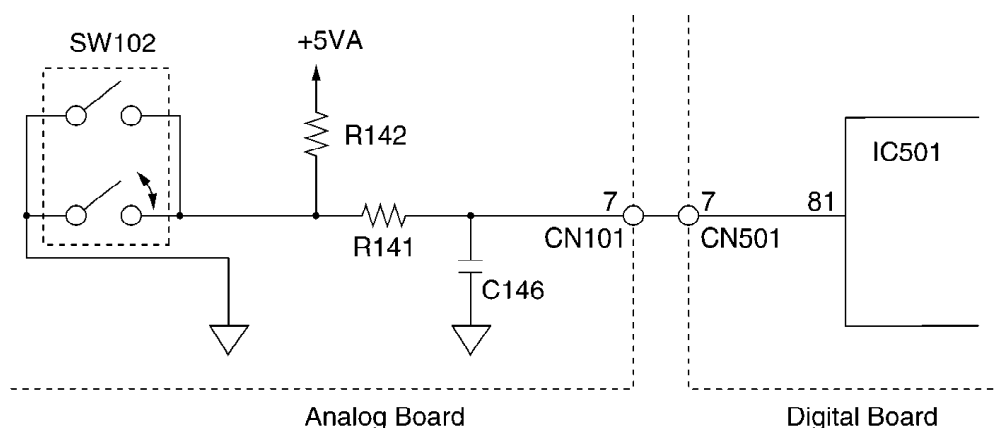


	Photo transistor	Signal (IC501-131 pin)
Set recording paper	OFF	High level
No recording paper	ON	Low level

6. [Motor Position Sensor (SW102)]

This sensor is a detection switch for recording the position of the CAM.



	Signal (IC501-81 pin)
Home position	Low level
Other	High level

6.6. MODEM SECTION

6.6.1. FUNCTION

The unit uses a 1 chip modem (IC505) that serves as an interface between the control section for FAX transmission and reception and the telephone line. During a transmitting operation, the digital image signals are modulated and sent to the telephone line.

During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. This 1 chip modem (IC505) has hardware which sends and detects all of the necessary signals for FAX communication.

It can be controlled by writing commands from the CPU (IC501: inside ASIC) to the register in the modem (IC505).

This modem (IC505) also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.

Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. ON CCITT (International Telegraph and Telephone Consultative Committee)

The No. XIV Group of ITU-T, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.

2. Definition of Each Group

- Group I (G1)

Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone lines. Determined in 1968.

Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.

- Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.

Methods to suppress redundancy are not used.

Determined in 1976.

- Group III (G3)

Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.

Determined in 1980.

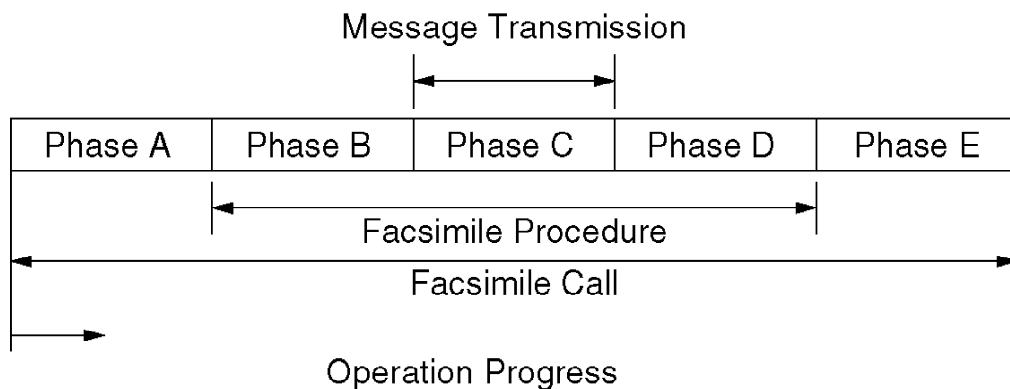
- Group IV (G4)

Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.

The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc., and for terminal control. It implements terminal preparation status, determines and displays terminal constants, confirms synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for the transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C is repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

[Transmission Time] = [Control Time] + [Image Transmission Time] + [Hold Time]

Transmission time consists of the following.

Control time:

This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:

This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:

This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

5. Facsimile Standards

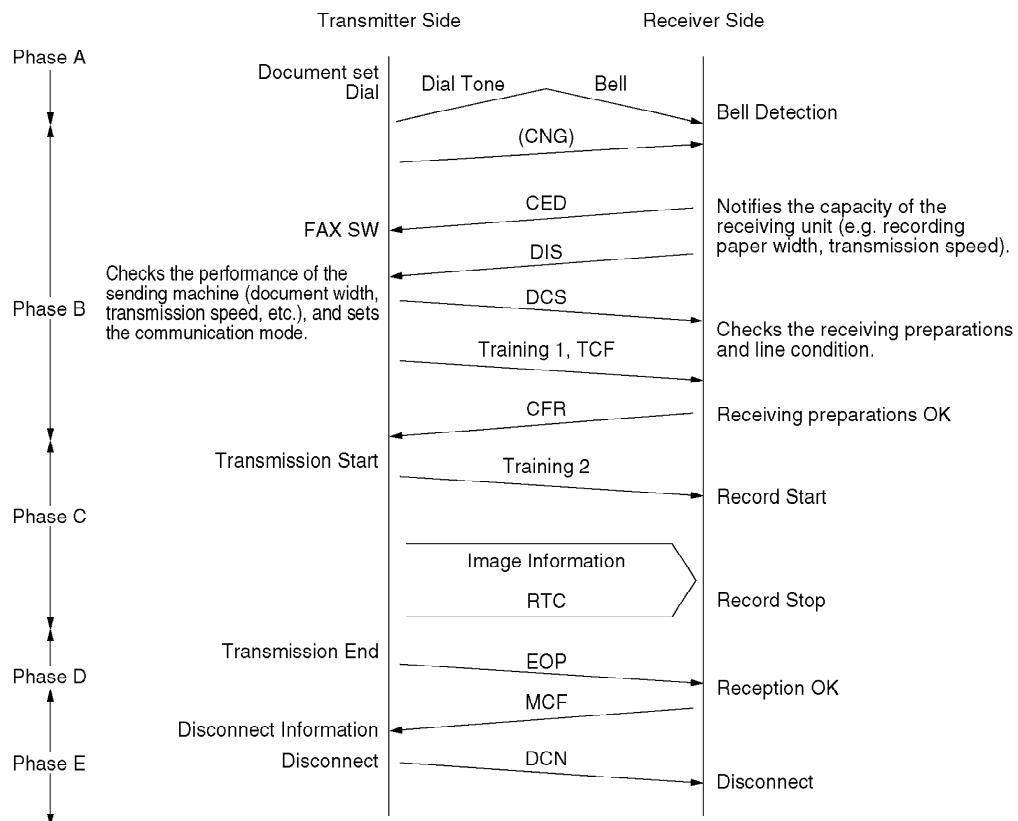
Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600 12000, 14400 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan : 8 pel/mm Sub Scan : 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal

Item	Telephone Network Facsimile
	G3 Machine
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value : 10, 20 Can be recognized in 40ms.

6. Explanation of Communication and Compression Technology

A. G3 Communication Signals (T. 30 Binary Process)

For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals. Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1. / An example of a binary process in G3 communication is shown below.



Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal) / Identification Signal Format.....00000001

Function: / Notifies the capacity of the receiving unit. The added data signals are as follows.

**Signal.....DCS (Digital Command Signal) / Identification Signal
Format.....X1000001**

Example (Some models do not support the following items.):

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	Reserved for future T.3 operation features	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation
11, 12, 13, 14	Data signaling rate	Data signaling rate
0, 0, 0, 0	V.27 ter fall back mode	2400 bit/s, V.27 ter
0, 1, 0, 0	V.27 ter	4800 bit/s, V.27 ter
1, 0, 0, 0	V.29	9600 bit/s, V.29
1, 1, 0, 0	V.27 ter and V.29	7200 bit/s, V.29
0, 0, 1, 0	Not used	14400 bit/s, V.33
0, 1, 1, 0	Reserved	12000 bit/s, V.33
1, 0, 1, 0	Not used	Reserved
1, 1, 1, 0	V.27 ter and V.29 and V.33	Reserved
0, 0, 0, 1	Not used	14400 bit/s, V.17
0, 1, 0, 1	Reserved	12000 bit/s, V.17
1, 0, 0, 1	Not used	9600 bit/s, V.17
1, 1, 0, 1	V.27 ter and V.29 and V.33 and V.17	7200 bit/s, V.17
0, 0, 1, 1	Not used	Reserved
0, 1, 1, 1	Reserved	Reserved
1, 0, 1, 1	Not used	Reserved
1, 1, 1, 1	Reserved	Reserved
15	R8x7.7 lines/mm and/or 200x200 pels/ 25.4mm	R8x7.7 lines/mm and/or 200x200 p 25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capability

Bit No.	DIS/DTC	DCS
17, 18 (0, 0) (0, 1) (1, 0) (1, 1)	Recording width capabilities 1728 picture elements along scan line length of 215 mm \pm 1% 1728 picture elements along scan line length of 215 mm \pm 1% 2048 picture elements along scan line length of 255 mm \pm 1% 2432 picture elements along scan line length of 303 mm \pm 1% 1728 picture elements along scan line length of 215 mm \pm 1% 2048 picture elements along scan line length of 255 mm \pm 1% Invalid	Recording width 1728 picture elements along scan length of 215 mm \pm 1% 2432 picture elements along scan length of 303 mm \pm 1% 2048 picture elements along scan length of 255 mm \pm 1% Invalid
19, 20 (0, 0) (0, 1) (1, 0) (1, 1)	Maximum recording length capability A4 (297 mm) Unlimited A4 (297 mm) and B4 (364 mm) Invalid	Maximum recording length A4 (297 mm) Unlimited B4 (364 mm) Invalid
21, 22, 23 (0, 0, 0) (0, 0, 1) (0, 1, 0) (1, 0, 0) (0, 1, 1) (1, 1, 0) (1, 0, 1) (1, 1, 1)	Minimum scan line time capability of the receiver 20 ms at 3.85 I/mm: $T_{7.7} = T_{3.85}$ 40 ms at 3.85 I/mm: $T_{7.7} = T_{3.85}$ 10 ms at 3.85 I/mm: $T_{7.7} = T_{3.85}$ 5 ms at 3.85 I/mm: $T_{7.7} = T_{3.85}$ 10 ms at 3.85 I/mm: $T_{7.7} = 1/2 T_{3.85}$ 20 ms at 3.85 I/mm: $T_{7.7} = 1/2 T_{3.85}$ 40 ms at 3.85 I/mm: $T_{7.7} = 1/2 T_{3.85}$ 0 ms at 3.85 I/mm: $T_{7.7} = T_{3.85}$	Minimum scan line time 20 ms 40 ms 10 ms 5 ms 0 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to "0".	Frame size 0 = 256 octets 1 = 64 octets
29	Error limiting mode	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PSTN
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field

Bit No.	DIS/DTC	DCS
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	Recording width Recording width indicated by bits Recording width indicated by this information
34	Recording width capability 1216 picture elements along scan line length of $151 \pm 1\%$	Middle 1216 elements of 1728 picture elements
35	Recording width capability 864 picture elements along scan line length of $107 \pm 1\%$	Middle 864 elements of 1728 picture elements
36	Recording width capability 1728 picture elements along scan line length of $151 \pm 1\%$	Invalid
37	Recording width capability 1728 picture elements along scan line length of $107 \pm 1\%$	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm	R16×15.4 lines/mm and/or 400×400 pels/25.4 mm
44	Inch based resolution preferred	Resolution type selection "0" : neuritic based resolution "1" : inch based resolution
45	Metric based resolution preferred	Don't care
46	Minimum scan line time capability for higher resolutions "0" : $T_{15.4} = T_{7.7}$ "1" : $T_{15.4} = 1/2 T_{7.7}$	Don't care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

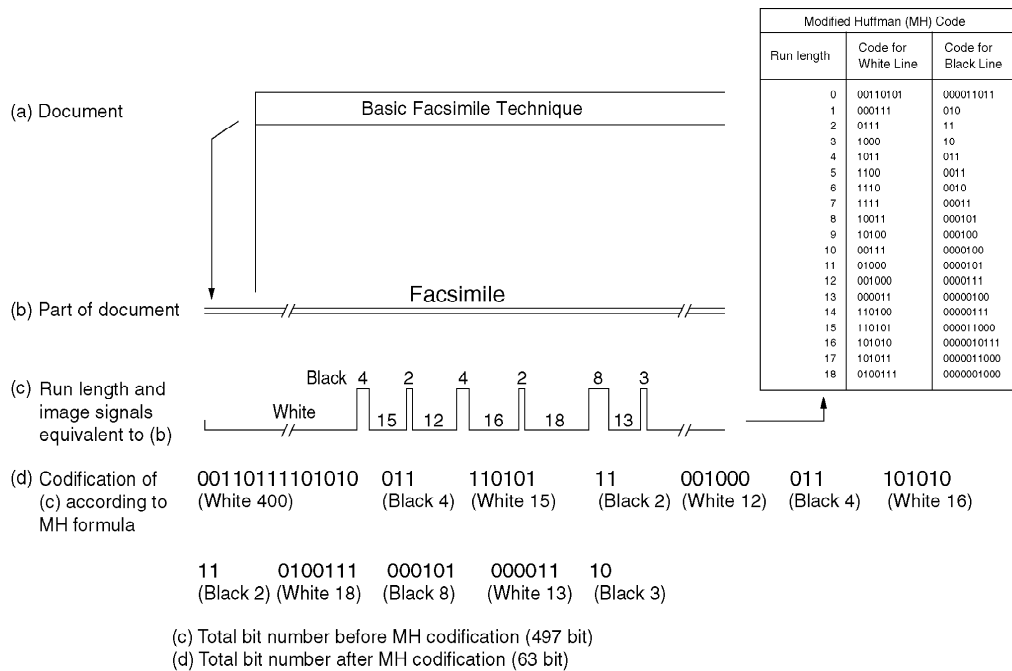
Note 1 - Standard facsimile units conforming to T.2 must have the following capability : Index of cooperation (IOC)=264.

Note 2 - Standard facsimile units conforming to T.3 must have the following capability : Index of cooperation (IOC)=264.

Note 3 - Standard facsimile units conforming to T.4 must have the following capability : Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	_____	A fixed pattern is transmitted to the receiving side at a speed (2400 to 9600 bps) designated by the sender, and the receiving side optimizes the automatic equalizer, etc., according to this signal.
TCF (Training Check)	_____	Sends 0 continuously for 1.5 seconds at the speed as the training signal.
CFR (Confirmation to Receive)	X0100001	Notifies the sending side that TCF has been properly received. If TCF is not properly received, FTT (Failure To Train) X0100010 is relayed to sender. The sender then reduces the transmission speed by one stage and initiates training once again.
Training 2	_____	Used for reconfirming the receiving side like training 1.
Image Signal	Refer to the next page.	_____
RTC (Return to Control)	_____	Sends 12 bits (0...01 × 6 times) to the receiving side at the same speed as the image signal and notifies completion of transmission of the first sheet.
EOP (End of Procedure)	X1110100	End of one communication
MCF (Message Confirmation)	X0110001	End of 1 page reception
DCN (Disconnect)	X1011111	Phase E starts.
MPS (Multi-Page Signal)	X1110010	Completion of transmission of 1 page. If there are still more documents to be sent, they are output instead of EOP. After MCF reception, the sender transmits an image signal of the second sheet.
PRI-EOP (Procedural Interrupt-EOP)	X1111100	If there is an operator call from the sender, it is output after RTC.
PIP (Procedural Interrupt Positive)	X0110101	This is output when an operator call is received.

B. Redundancy Compression Process Coding Mode / This unit uses one-dimensional MH format.



6.6.2. MODEM CIRCUIT OPERATION

The modem (IC505) has all the hardware satisfying the CCITT standards mentioned previously. When the ASIC IC501 (77) is brought to a low level, the modem (IC505) is chip-selected and the resistors inside IC are selected by the select signals from ASIC (IC501) ADR0-ADR4. The commands are written through the data bus, and all the processing is controlled by the ASIC (IC501) according to CCITT procedures. The INT signal dispatched from IRQ1, 2 (pins 108 and 121 of IC505) to ASIC (IC501) when the transmission data is accepted and the received data is demodulated, the ASIC (IC501) implements post processing. This modem (IC505) has an automatic application equalizer.

With training signal 1 or 2 during G3 reception, it can automatically establish the optimum equalizer. The modem (IC505) operates using the 32.256 MHz clock (X503).

1. Facsimile Transmission

The digital image data on the data bus is modulated in the modem (IC505), and sent from pin 69 via amplifier IC101 and the NCU section to the telephone line.

Refer to **CHECK SHEET** ().

2. Facsimile Reception

The analog image data which is received from the telephone line passes through the NCU section and enters pin 60 of the modem (IC505). The signals that enter pin 60 of the modem (IC505) are demodulated in the board to digital image signals, then placed on the data bus.

In this case, the image signals from the telephone line are transmitted serially. Hence, they are placed on the bus in 8 bit

units. Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.

This is designed to correct the characteristics of the frequency band centered about 3 kHz and maintain a constant receiving sensitivity. It can be set in the service mode.

Refer to **CHECK SHEET** ().

3. DTMF Transmission (Monitor tone)

The DTMF signal generated in the modem (IC505) is output from pin 69, and is then sent to the circuit on the same route as used for facsimile transmission.

Refer to **CHECK SHEET** ().

(DTMF Monitor Tone)

Refer to **CHECK SHEET** ().

4. Call Tone Transmission

This is the call signal which is generated in the ASIC (IC501) and sent to the speaker.

Refer to **CHECK SHEET** ().

5. Busy/Dial Tone Detection

The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the modem (IC505) becomes 1, and this status is monitored by the ASIC (IC501).

6.7. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

1. Function

The analog section works as an interface between the telephone line.

The analog gate array (IC551) on the digital board exchanges FAX TX and RX signals between the MODEM (IC505) and the analog section. / The control signals transmitted to the analog section are output mainly from ASIC IC501, and the analog status is stored as data in ASIC IC501.

2. Circuit Operation

[NCU]:Network Control Unit

The NCU comprises of the following; DC loop forming circuit to connect with the telephone line; Switching circuit for other interconnected telephones; Bell detection circuit; Pulse dial

generation circuit; Extension phone line off-hook detection circuit; Sidetone circuit; Remote fax activation circuit.

Refer to **NCU SECTION()** for the details.

6.7.1. ANALOG UNIT BLOCK DIAGRAM

6.8. NCU SECTION

6.8.1. GENERAL

NCU is the interface with the telephone line. It is composed of Remote FAX activation circuit, Bell detection circuit, Pulse dial circuit, CPC detection circuit, Line amplifier and sidetone circuits and Multiplexer. The following is a brief explanation of each circuit.

6.8.2. REMOTE FAX ACTIVATION CIRCUIT

1. Circuit Operation

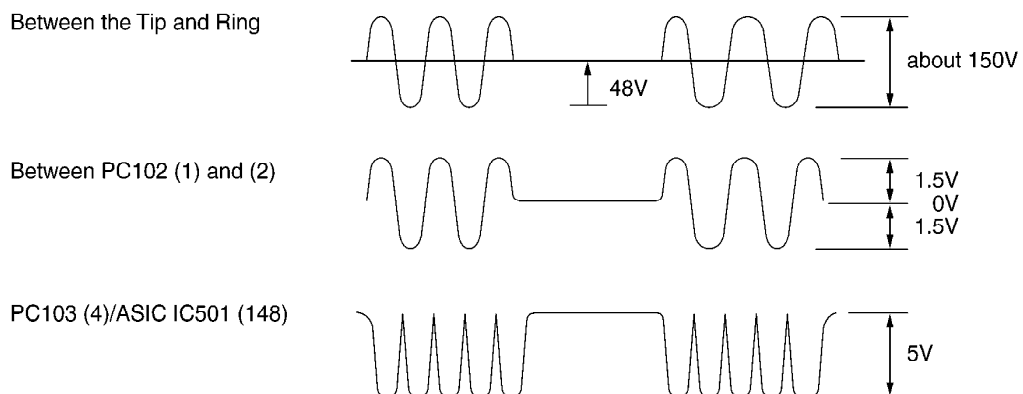
After detecting the bell signal, another telephone connected to the same line switches to the FAX mode by DTMF signal.

TEL LINE → T102 → CN106 (3) → {CN507(3) → C630 → R581 → IC514 (20-31) → R610 → C616 → IC505 (60)}

6.8.3. BELL DETECTION CIRCUIT

1. Circuit Operation

The signal waveform for each section is indicated below. The signal (low level section) input to pin 148 of ASIC IC501 on the digital board is illustrated.



TEL LINE → PC102 (1, 2 → 4) → IC501 (148): Bell

6.8.4. PULSE DIAL CIRCUIT AND ON/OFF HOOK CIRCUIT

While OFF-HOOK, RL101 is ON. Q108 turns on by pin (18) of IC501 as well. On the other hand, while ON-HOOK, Q115 turns OFF by pin (18) of IC501, then the line turns OFF. ON/OFF-HOOK, controlled by pin (18) of IC501, makes the pulse dial operation possible.

IC501 (18) LINE RLY Low Level → CN501 (2) → CN101 (2) → Q115 OFF → RL101 OFF : DC Loop OFF

IC501 (18) LINE RLY High Level → CN501 (2) → CN101 (2) → Q115 ON → RL101 ON : DC Loop

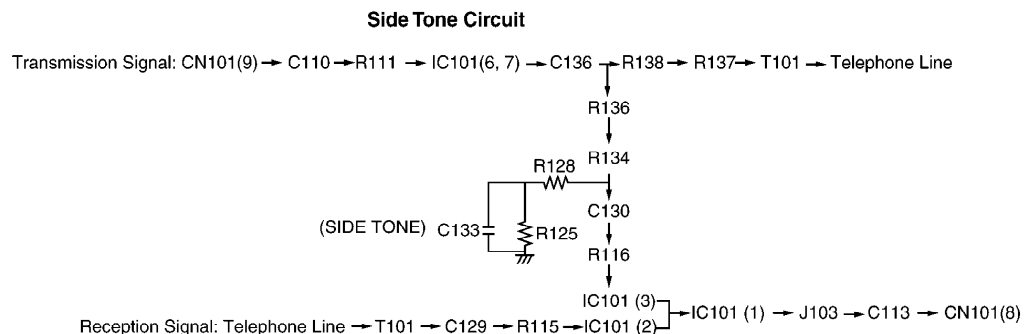
ON

6.8.5. LINE AMPLIFIER AND SIDE TONE CIRCUITS FOR KX-FM89BX

1. Circuit Operation

The reception signal output from the line transformer T101 is input to pin (3) of IC101 via C129 and R115, and then the signal is amplified at pin (1) of IC101 and sent to the reception system at 10dB.

The transmission signal goes through C110 and R111 and enters IC101-pin (6), where the signal is amplified to about 16.5dB. Then, it is output from pin (7) of IC101 and transmitted to T101 via C136, R138 and R137. If the side tone circuit is not applied, the transmission signal will return to the reception amplifier via C129 and R115. When the side tone circuit is active, the signal output from IC101 pin (7) passes through C136, R136, R134, C130, R116 and goes into the amplifier IC101 pin (3). This circuit is used to cancel the transmission return signal.



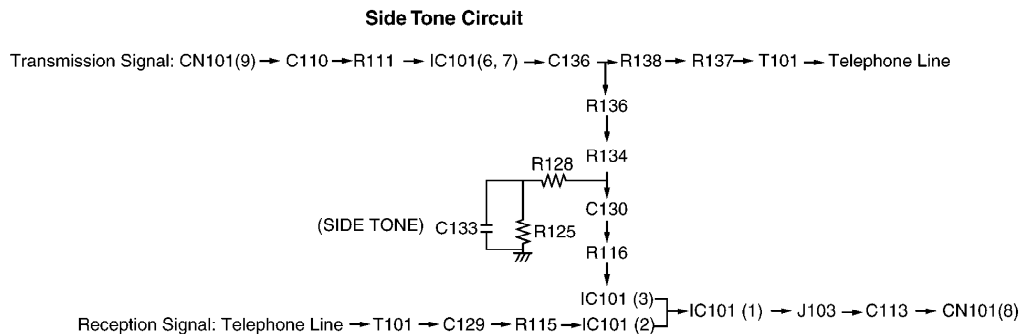
6.8.6. LINE AMPLIFIER AND SIDE TONE CIRCUITS FOR KX-FM89CX

1. Circuit Operation

The reception signal output from the line transformer T101 is input to pin (2) of IC101 via C129, R115 and then the signal is amplified at pin (1) of IC101 and sent to the reception system at 6dB.

The transmission signal goes through C110 and R111 and enters IC101-pin (6), where the signal is amplified to about 12dB. Then, it is output from pin (7) of IC101 and transmitted to T101 via C136, R138, and R137. If the side tone circuit is not applied, the transmission signal will return to the reception amplifier via C129, R115. When the side tone circuit is active, the signal output from IC101 pin (7) passes through C136, R136, R134, C130 and R116

and goes into the amplifier IC101 pin (3). This circuit is used to cancel the transmission return signal.



6.8.7. AUTO DISCONNECT CIRCUIT

1. Function

This circuit is used to detect that the telephone connected in parallel to the same line is OFF-HOOK while the unit picks up the line.

2. Circuit Operation

If the line is picked up, C104 is charged by the following path shown below.

Tip (Ring) → D118 → R185 → D115 → R182 → Q111 → PC104

If a telephone connected in parallel goes into OFF-HOOK status, the base of Q111 becomes low and PC104 turns OFF.

When the line is connected, Q111 and PC104 turn on, then pin (152) of IC501 (ASIC) on the digital board becomes low. On the other hand, When the line is disconnected, Q111 and PC104 turn off, then the pin (152) of IC501 (ASIC) becomes high.

6.8.8. CPC (Calling Party Control) DETECTION CIRCUIT

1. Function

This circuit detects the signal (cuts the current) output from the converter when the other party finishes ICM recording and goes into the ON-HOOK status.

TAD detects this signal and disconnects the line. When the TAD is operating, pin (4) of PC107 becomes a low level.

While detecting the CPC signal, pin (4) of PC107 becomes a high level. When the CPC signal is detected, the TAD operation stops and the line is disconnected.

6.9. ITS (Integrated telephone System) and MONITOR SECTION

6.9.1. GENERAL

The general ITS operation is performed by the special IC505 which has a handset circuit. The alarm tone, the key tone, and the beep are output from the ASIC IC501 (digital board). During the pulse dial operation, the monitor tone is output from the ASIC IC501.

6.9.2. SPEAKER PHONE CIRCUIT

1. Function

The circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands-free mode.

2. Circuit Operation

The speakerphone can only provide duplex.

3. Signal path

Refer to **CHECK SHEET** ().

6.9.3. HANDSET CIRCUIT

1. Function

This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. Signal path

Refer to **CHECK SHEET** ().

6.9.4. MONITOR CIRCUIT FOR EACH SIGNALS

1. Function

This circuit monitors various tones, such as 1 DTMF tone, 2 Alarm /Beep/Key tone/Bell 3 Dummy ring back tone.

2. Signal path

Refer to **CHECK SHEET** ().

6.10. ATAS (Automatic Telephone Answering System) SECTION

1. Function

The ATAS main operation is performed by the special IC505 (MODEM). IC512 (FLASH MEMORY)'s control signals are input from ASIC IC501.

A. Greeting/Message Recording

B. ICM Recording

- C. Greeting/Message/ICM play to speaker
- D. Greeting/Message/ICM play to Tel Line
- E. Vox Detection

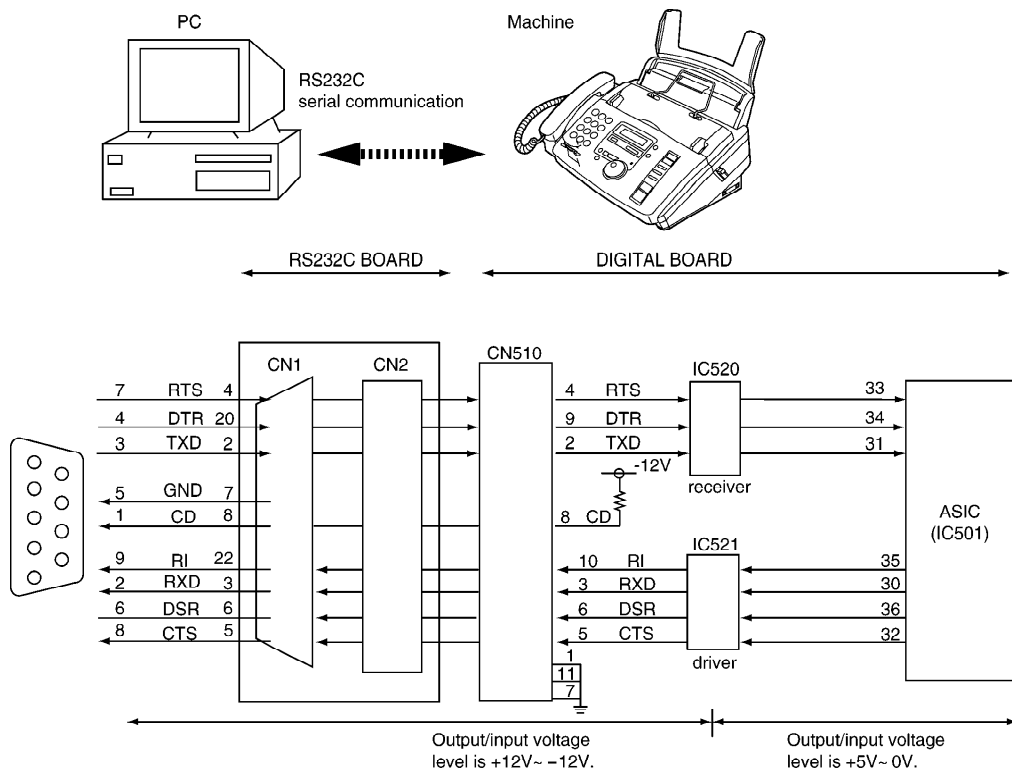
2. Signal Path

Refer to **CHECK SHEET** ().

6.11. RS-232C SECTION (RS-232C serial communication)

6.11.1. OUTLINE

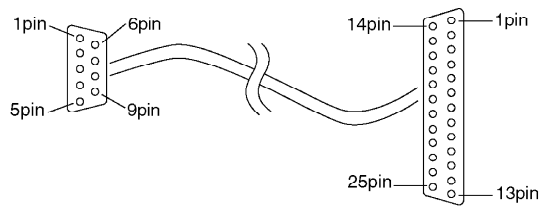
The model has a communication port designed for RS-232C serial communication. (The EIA Standards specify the interface cable type (No. RS232C) and the voltage levels. You can connect the FAX machine to a printer (200dpi), scanner and fax modem with the interface cable and the attached software CD-ROM. This PC interface enables you to store the transmitted/received data into memory (on you PC hard disk) and to manage the data as file.



6.11.2. ELECTRICAL SPECIFICATIONS

Electrical specifications	
Output voltage level	±12V spece -12V mark
Output imperdance	Ro > 300 Ω (Excepting CD: 2kΩ)
Input imperdance	7kΩ > Ri > 3kΩ
Communication speed	~19.2kbps

6.11.3. CABLE



Use modem cable or RS-232C data communication cable.
(Cable type is specified in Operating Instructions..)

Note:

The open circuit driver voltage (output) of this set is +12V ~ -12V. The minimum input signal voltage must fall outside the transition region of $\pm 3V$.

The output voltage range that is terminated with a load between 3kW and 7kW will be between $\pm 5V$ and $\pm 12V$.

6.12. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes). They are controlled by the Gate Array (IC301) and ASIC (IC501: on the DIGITAL BOARD). (Fig.-a) / The key matrix table is shown below.

Key Matrix

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6
KSL0		SW306 MENU	SW311 9	SW316 *	SW321 RECORD	SW326 0	SW331 ERASE
KSL1	SW302 HELP	SW307 MUTE	SW312 5	SW317 4	SW322 6	SW327 PLAY MESSAGES	
KSL2	SW303 VOL UP	SW308 COLLATE	SW313 2	SW318 1	SW323 RESOLUTION		SW333 3
KSL3	SW304 VOL DOWN	SW309 QUICK SCAN	SW314 COPY/START/SET	SW319 REDIAL/PAUSE	SW324 SP-PHONE	SW329 FLASH	SW334 STOP
KSL4	SW305 AUTO ANSWER		SW315 8	SW320 7		SW330 DIRECTORY PROGRAM	SW335 #

XL

	XL12	XL11
	DOCUMENT SET	DOCUMENT TOP

LED

	LED2	LED3	LED4
			LED303 PLAY MESSAGES

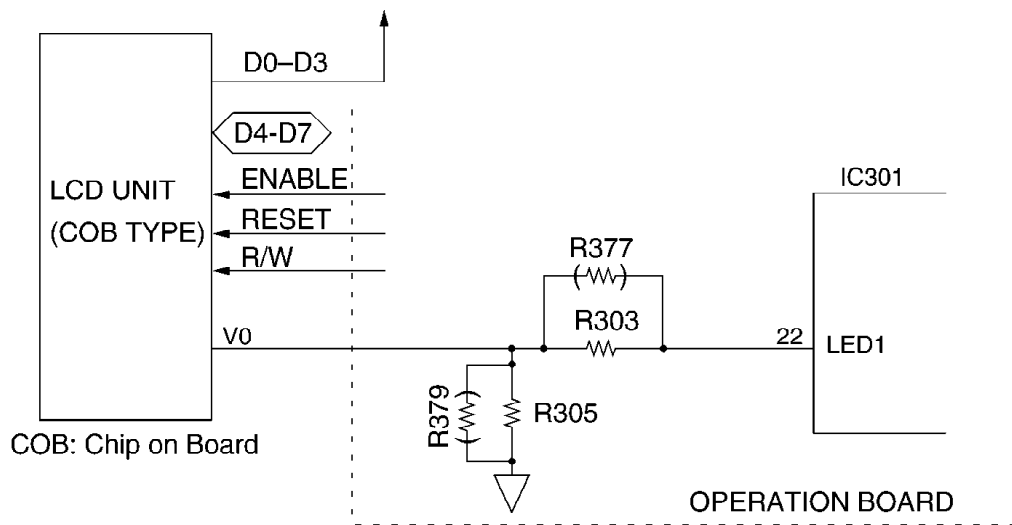
6.13. LCD SECTION

The Gate Array (IC301) works only for writing the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive.

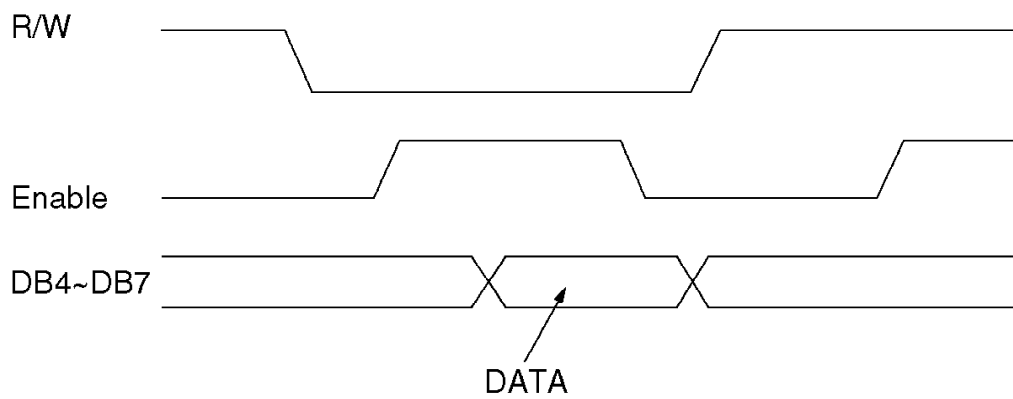
R303(R377) and R305(R379) are density control resistors.

Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC301).

Circuit Diagram



Timing Chart

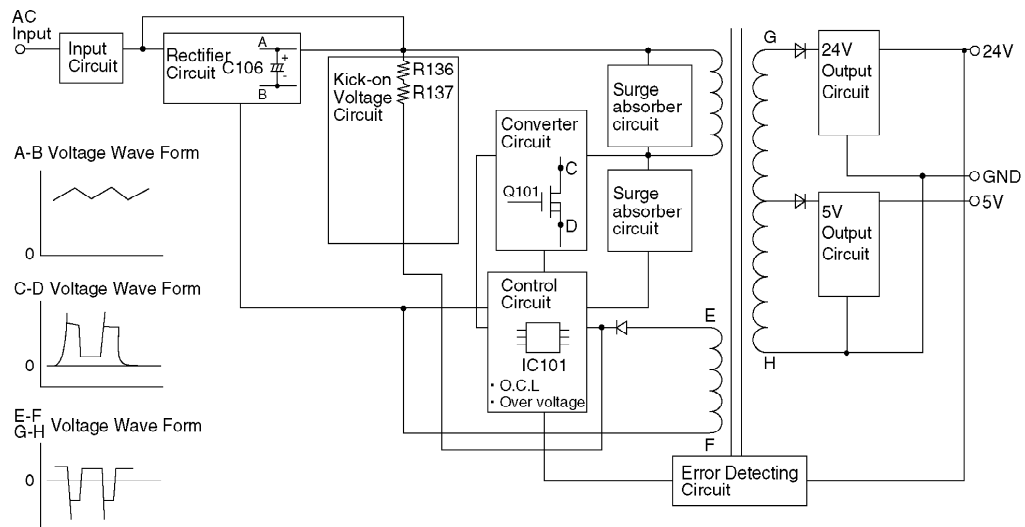


Density	Normal	Dark
LED1 (IC301-22pin)	H	L

6.14. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

Block Diagram



[Input Circuit]

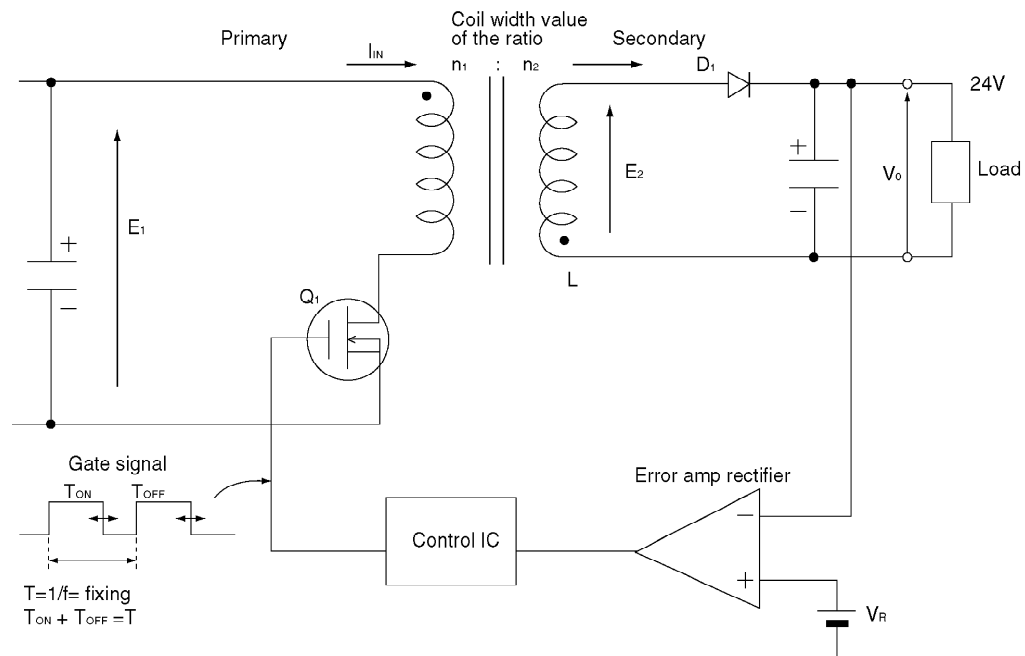
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

The input current is rectified by D101,D102,D103 and D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.



The following is an overview of how the power supply unit is controlled.

The control method of this power supply unit is pulse width modulation.

When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1 . When Q_1 is OFF, the energy is output from the secondary transfer as follows.

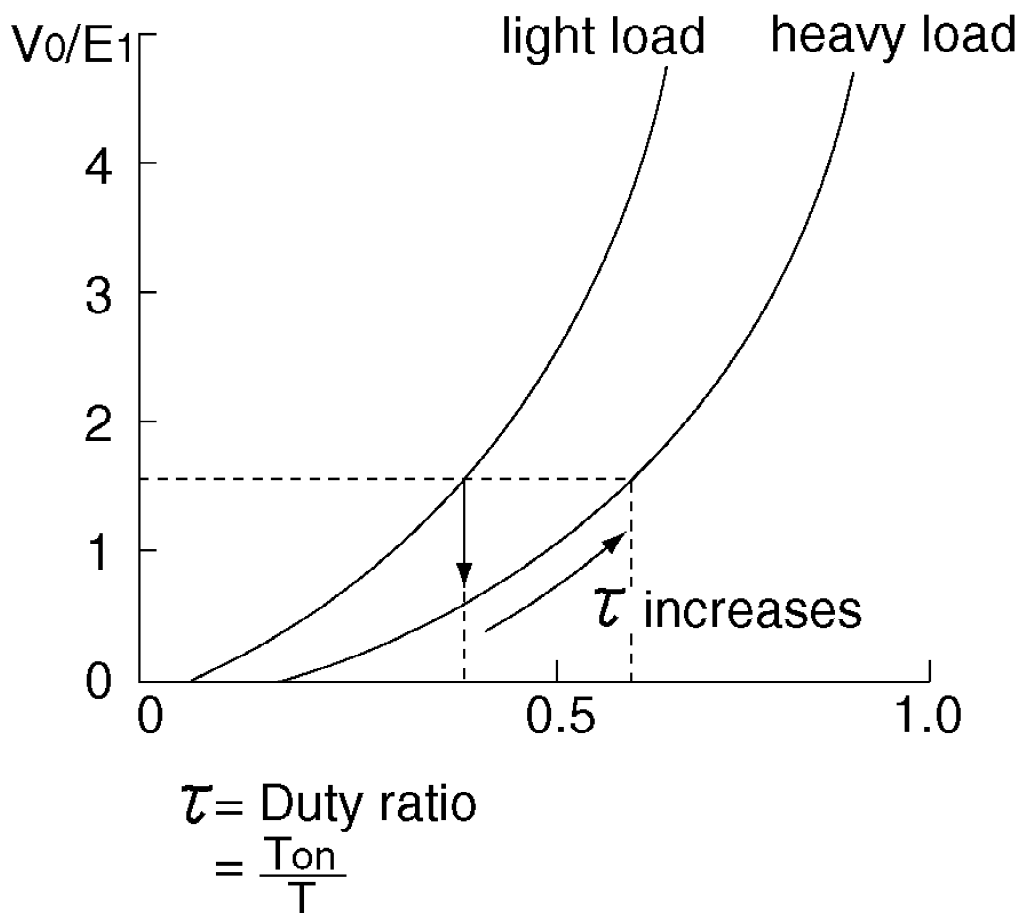
$L \rightarrow D_1 \rightarrow \text{Load} \rightarrow L$

Then the power is supplied to the Load. When Q1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how Ton is controlled, stabilization occurs. Also, when the current load becomes

too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.

Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.

Output/Input voltage value of ratio



[Surge Absorber Circuit]

This circuit is for absorbing surge voltage generated by the transformer.

[Control Circuit and Detecting Circuit]

The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.

In this power supply, the duty ratio is defined by changing the ON period of the main transistor. This is shown as follows.

When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L)]

The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is

limited by this circuit.

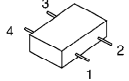
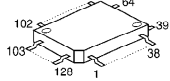
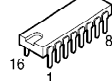
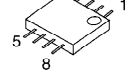

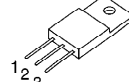

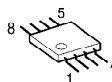
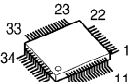
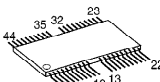
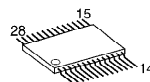

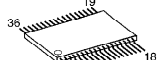
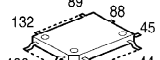

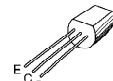
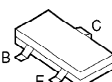
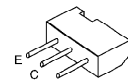
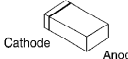
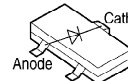
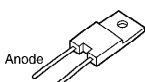
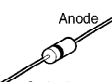
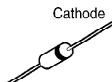
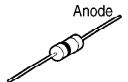



[Over Voltage Circuit]

If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

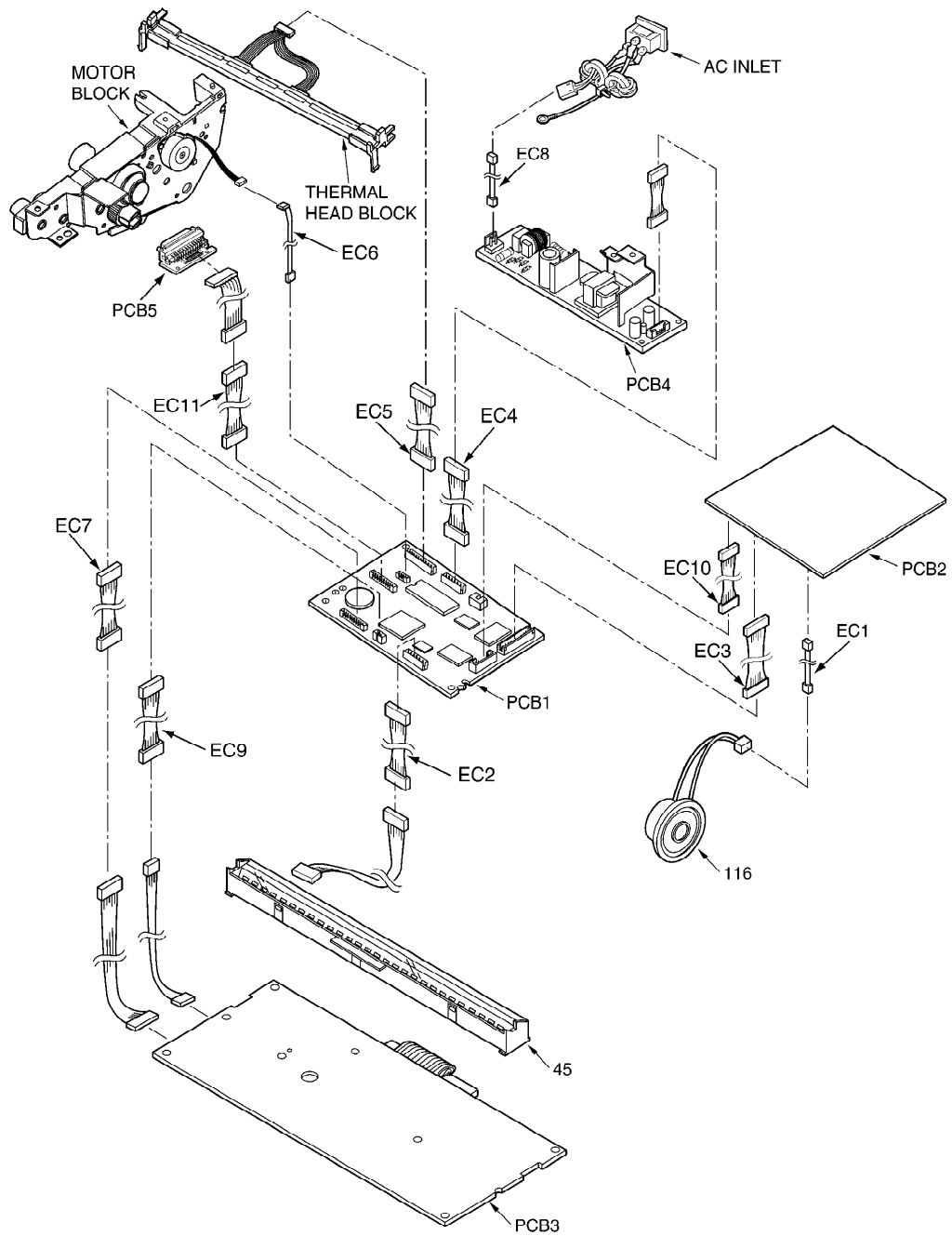
Dummy load method (to quickly check the power supply output)

Refer to **POWER SUPPLY BOARD SECTION()**.

7. TERMINAL GUIDE OF THE IC'S TRANSISTORS AND DIODES

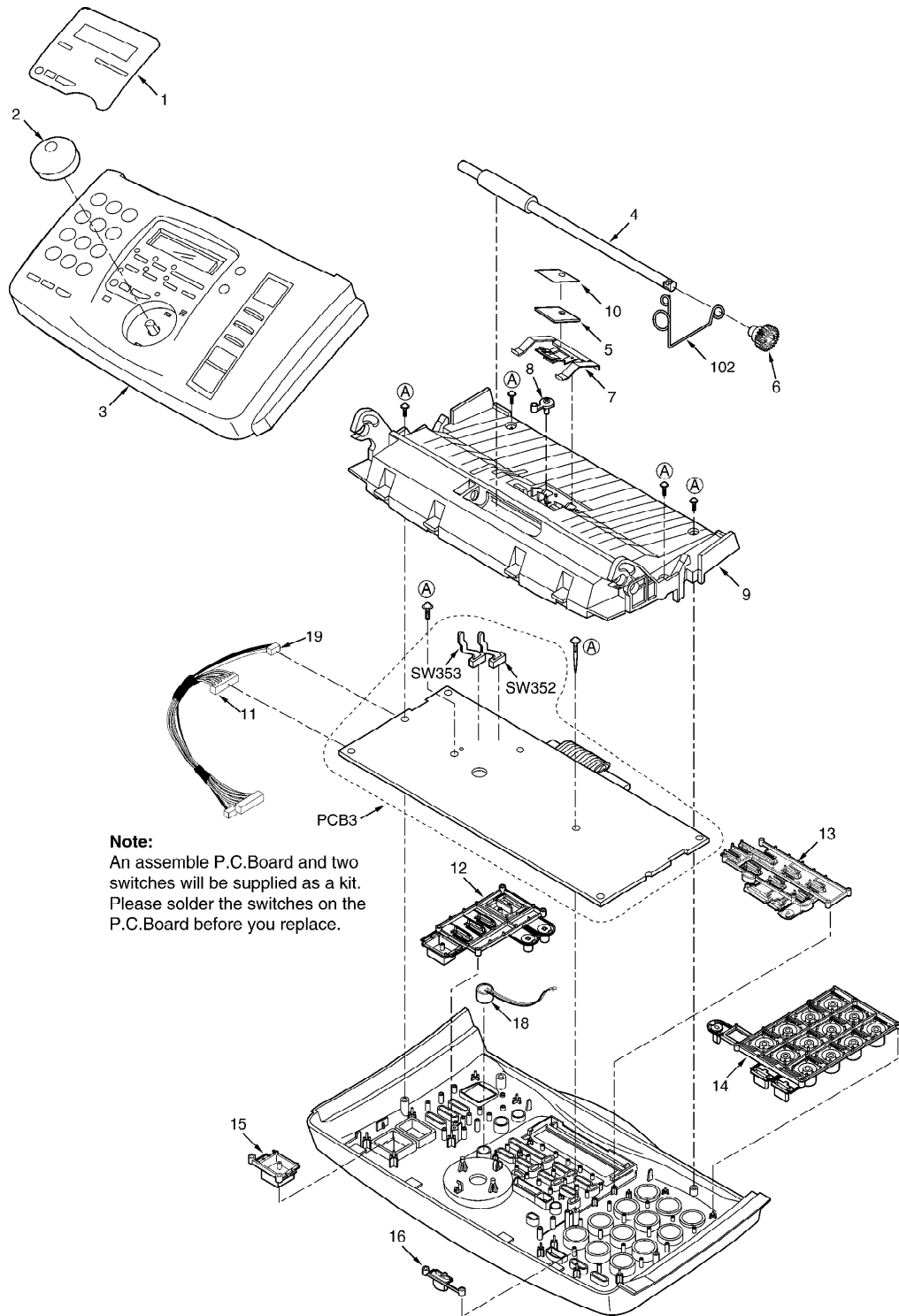
 PFVIXCN4202N	 PFVIR675813	 PFVIT2003APS	 PFVTSI4431DY	 PFVIFA5317P
 PQVITA7805F	 PFWIFM89BX PFWIFM89CX	 PQVIMC34119M PQVINJM4558M PQVINJM2904M	 MN7D032Z9J	 PFVIKM29W4AT
 PFVIM0525LFF PFVIMS5148F	 PFVIMM1385EN	 AN6383SB	 PFVIM66429M1	 AN1431T, 2SK2640
 2SC2235	 PQVTDTC143E PQVTDTC114EU 2SB709A, 2SC4155S	 2SB1322	 MA143	 MA141WK
 PFVDSF5LC20U	 PQVDERA1802 PFVDAG01A	 1SS119	 MA7160, PFVD1N4005 MA4220, PFVDD1NL20U	 PFVDRMRLS245 MA4056
 LNJ801LPDJA	 PQVDRLS73T			

8. FIXTURES AND TOOLS

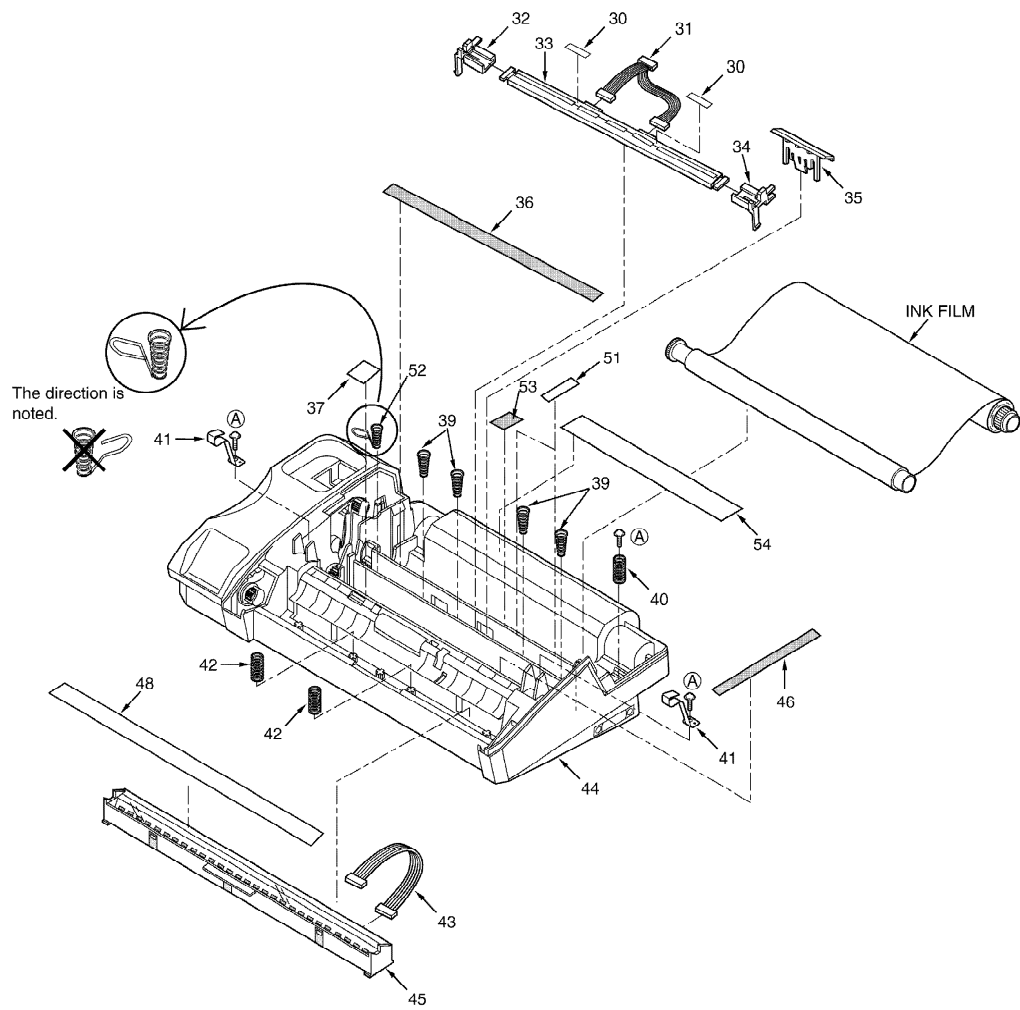


9. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

9.1. OPERATION PANEL SECTION

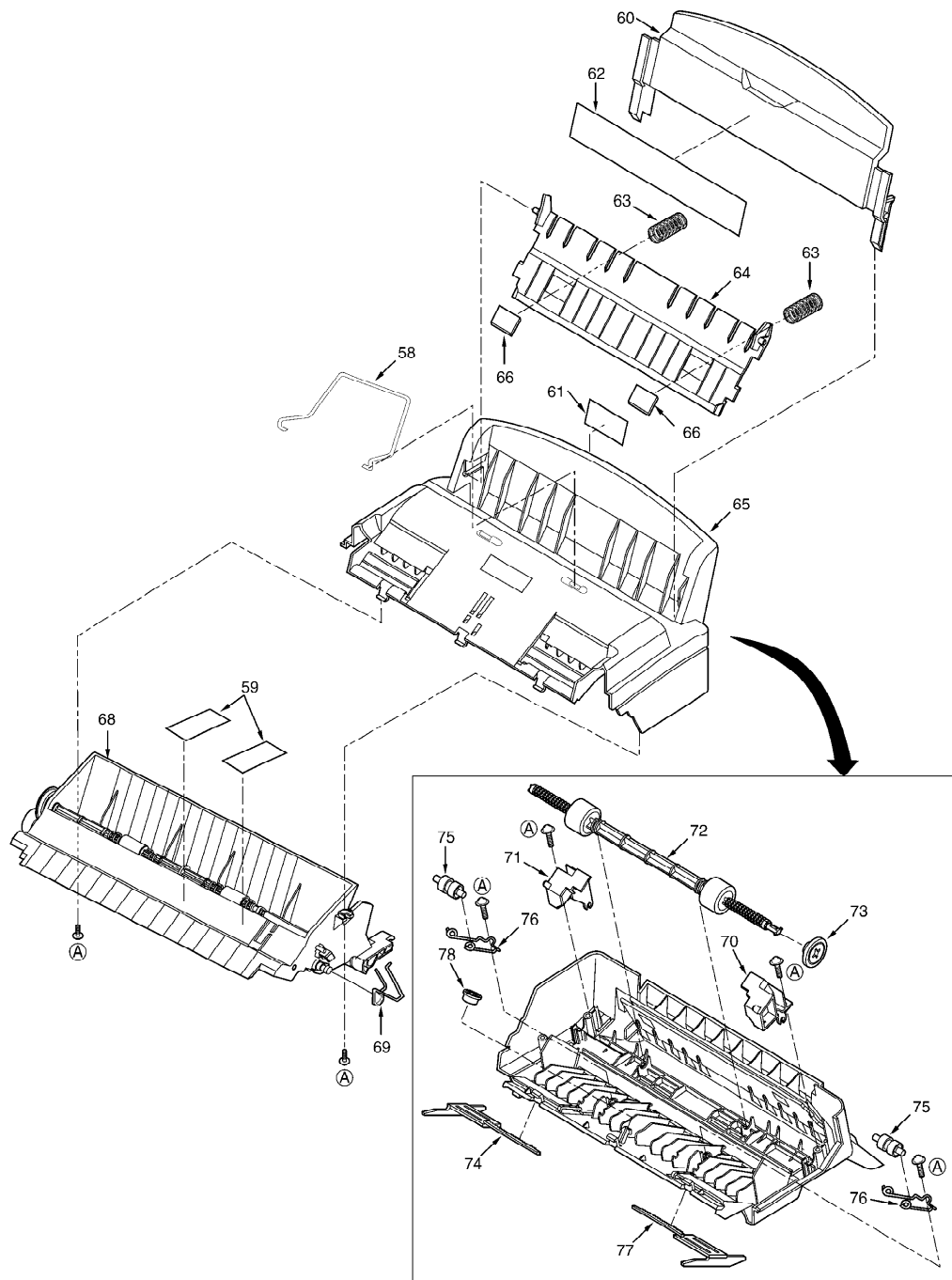


9.2. UPPER CABINET SECTION

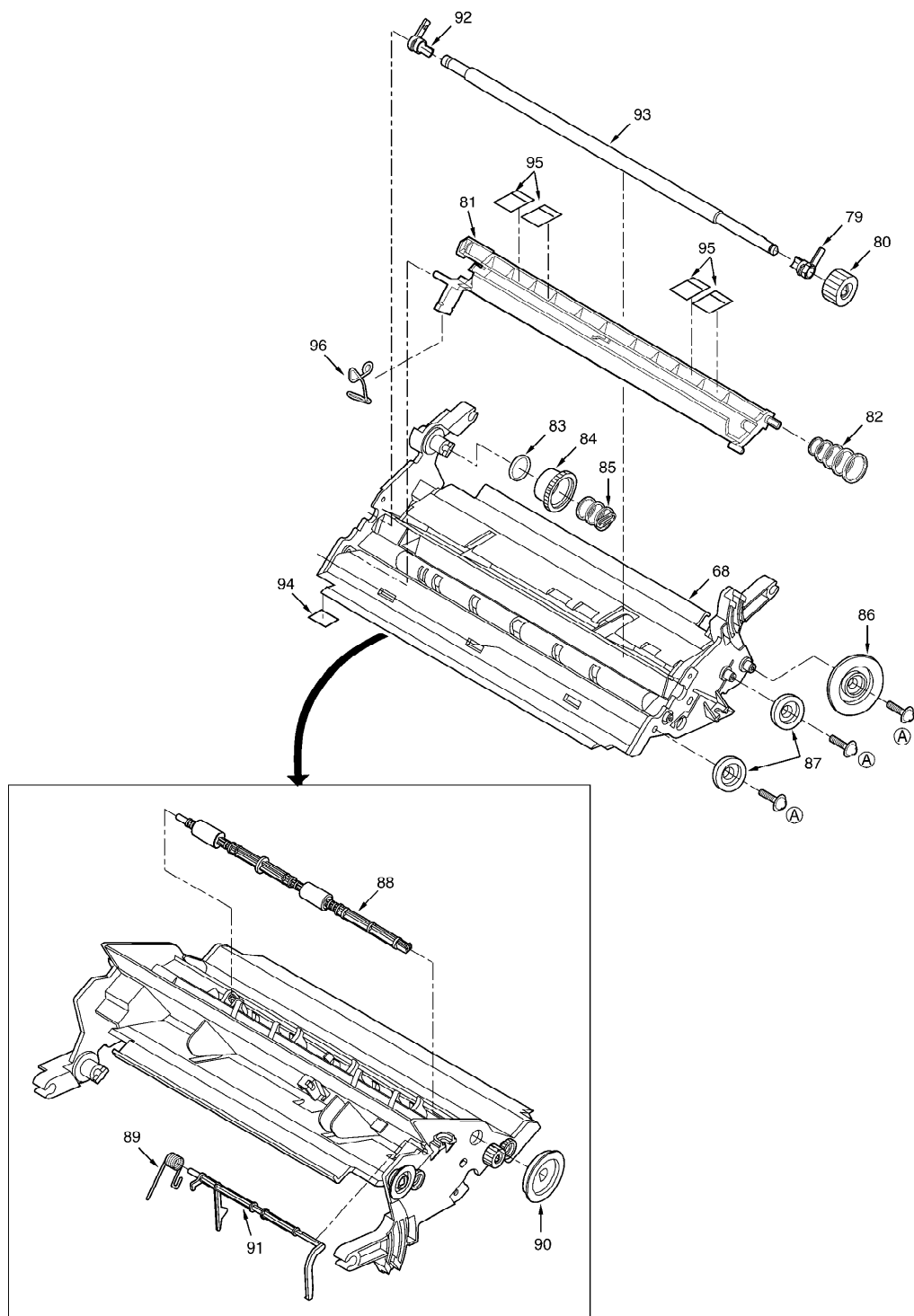


9.2.1. BACK COVER SECTION

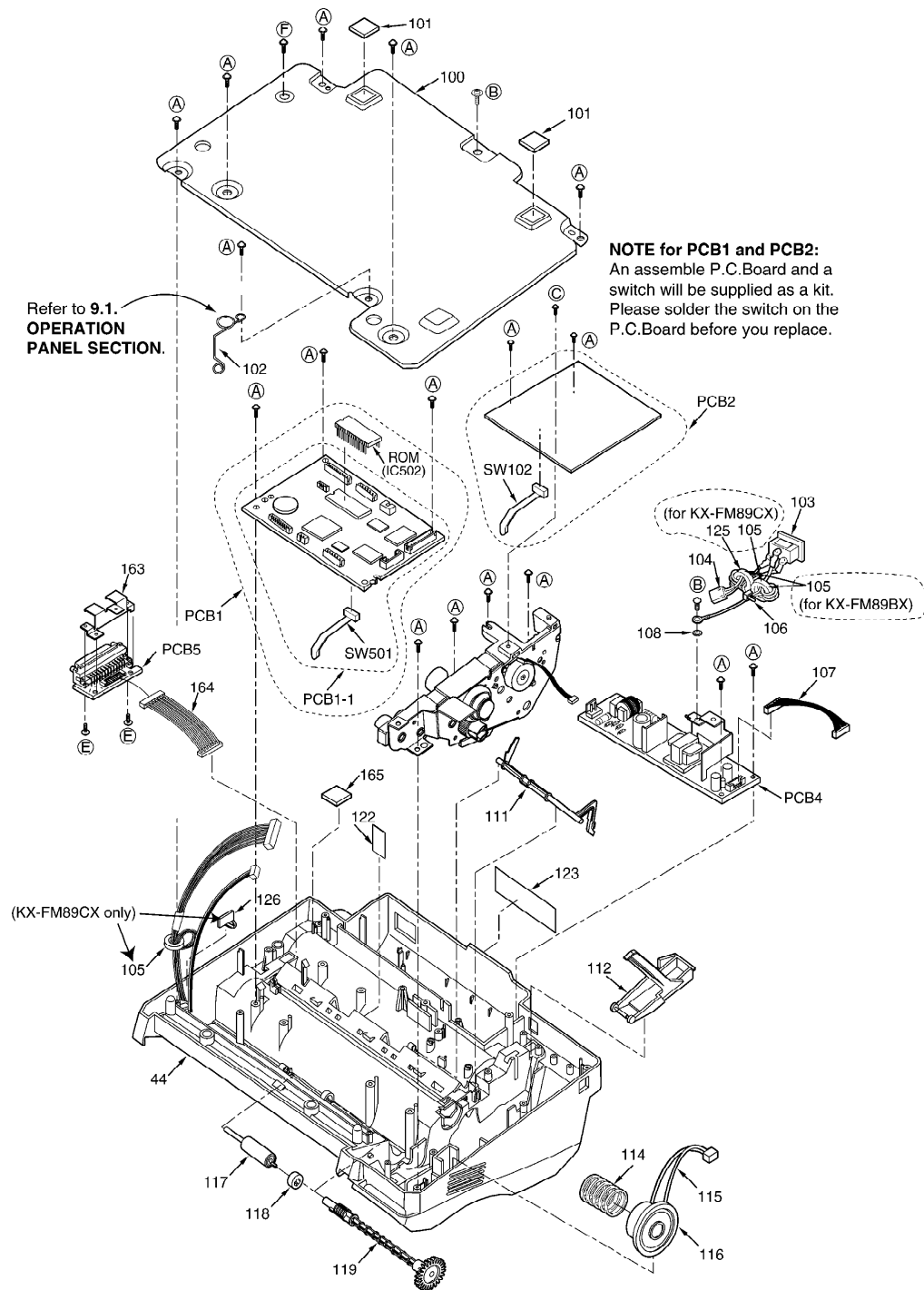
9.2.1.1. BACK COVER 1



9.2.1.2. BACK COVER 2

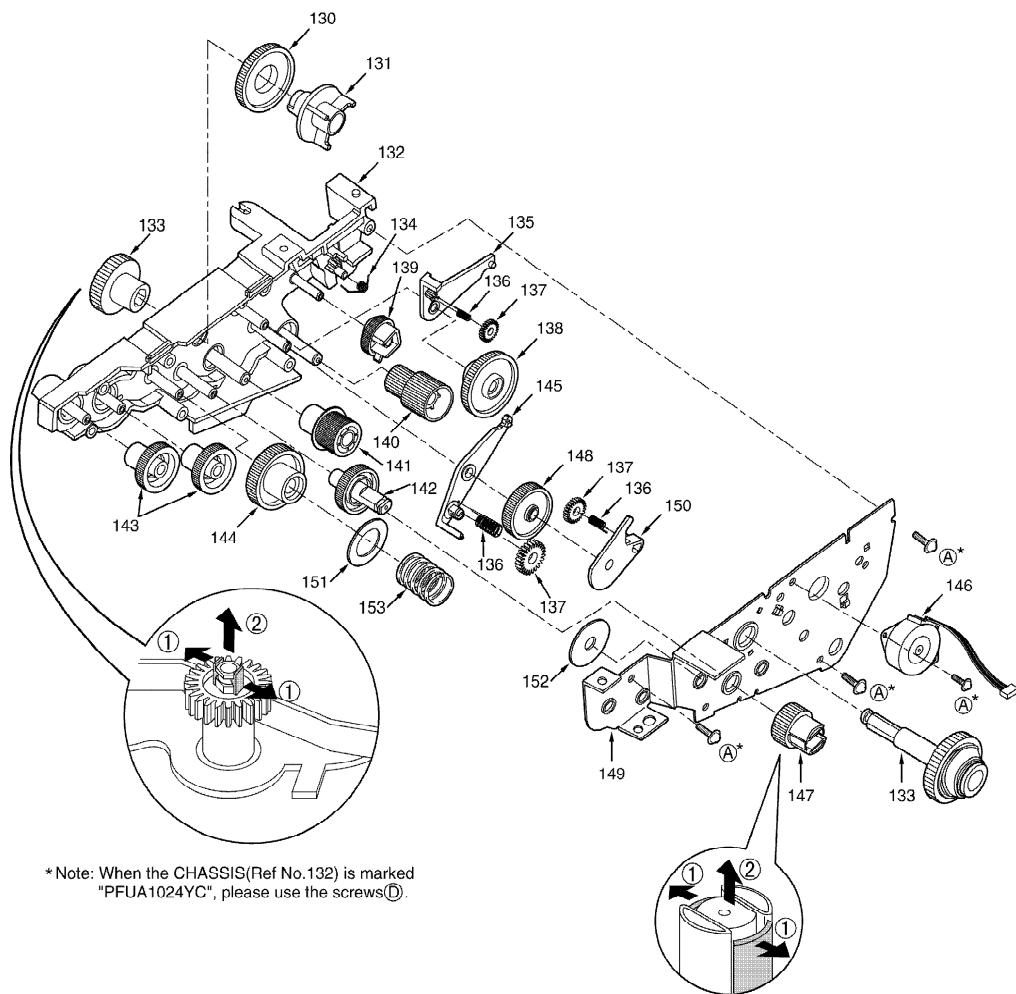


9.3. LOWER/P.C.B. SECTION

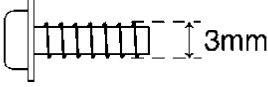

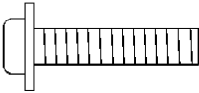
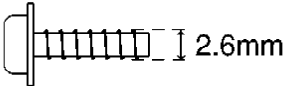

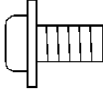


CROSS REFERENCE:
OPERATION PANEL SECTION()

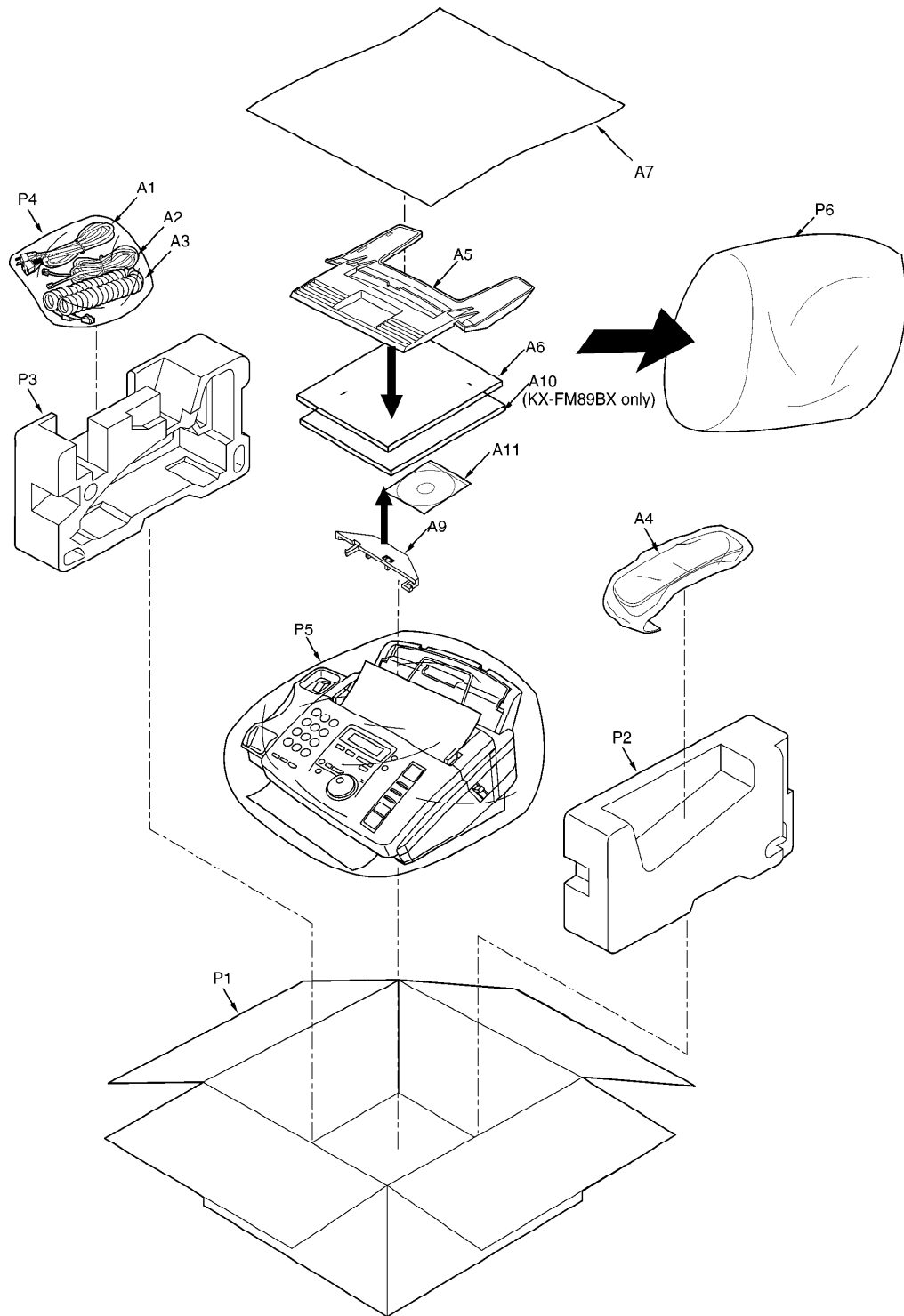
9.4. MOTOR SECTION



9.5. ACTUAL SIZE OF SCREWS AND WASHER

	Part No.	Illustration
Ⓐ	XTW3+S10P	
Ⓑ	XSB4+6	
Ⓒ	XTW3+U14L	
Ⓓ	XTW26+S10P	
Ⓔ	XYC3+CF12FR	
Ⓕ	XTW3+U6LFZ	

10. ACCESSORIES AND PACKING MATERIALS



11. REPLACEMENT PARTS LIST

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item.

After the discontinuation of this assembly in production, the item

will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.

After the end of this period, the assembly will no longer be available.

2. Important safety notice / Components identified by \triangle mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS / Unless otherwise specified; / All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω / All capacitors are in MICRO FARADS (μ F) P= μ μ F / *Type & Wattage of Resistor

Type					
ERC:Solid		ERX:Metal Film		PQRD:Carbon	
ERD:Carbon		ERG:Metal Oxide		PQRQ:Fuse	
PQ4R:Chip		ERO:Metal Film		ERF:Wire Wound	
Wattege					
10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W
ECFD:Semi-Conductor		ECCD,ECKD,PQCBC,PQVP : Ceramic			
ECQS:Styrol		ECQM,ECQV,ECQE,ECQU,ECQB : Polyester			
PQCBX,ECUV:Chip		ECEA,ECSZ,ECOS : Electrolytic			
ECMS:Mica		ECQP : Polypropylene			
Voltage					
ECQ Type	ECQG ECQV Type	ECSZ Type	Others		
1H : 50V	05 : 50V	OF : 3.15V	OJ : 6.3V	1V : 35V	
2A : 100V	1 : 100V	1A : 10V	1A : 10V	50,1H : 50V	
2E : 250V	2 : 200V	1V : 35V	1C : 16V	1J : 63V	
2H : 500V		OJ : 6.3V	1E,25 : 25V	2A : 100V	

11.1. CABINET AND ELECTRICAL PARTS

11.1.1. OPERATION PANEL SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
1	PFGP1189S	PANEL, LCD	
2	PFBE1005Z1	KNOB, JOG DIAL	
3	PFGG1064T1	GRILLE, OPERATION PANEL	
4	PFDN1040Z	ROLLER, DOCUMENT EXIT	
5	PFHG1075Z	SPACER, DOCUMENT SEPARATION	
6	PFDG1148Z	GEAR, DOCUMENT EXIT ROLLER	
7	PFUS1229Z	SPRING, DOCUMENT SEP	
8	PFHR1182Y	ROLLER, DOCUMENT ADJUST	
9	PFUV1027X	COVER, OPERATION PANEL	
10	PFHX1373Z	INSULATOR, SEPARATION RUBBER	
11	PFJS11Q70Z	CONNECTOR, 11P	
12	PFBX1096X1	BUTTON, STOP/VOLUME	
13	PFBX1097Q1	BUTTON, FUNCTION	
14	PFBX1095X1	BUTTON, DIALER	
15	PFBC1057Y1	BUTTON, START	
16	PFBC1058Y2	BUTTON, SP-PHONE	
17	Not Used		
18	PQJM128Z	MICROPHONE	
19	PFJS02Q78Z	CONNECTOR, 2P	

11.1.2. UPPER CABINET SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
30	PFHX1350Z	SPACER, THERMAL HEAD	
31	PFJS11Q69Z	CONNECTOR, 11P	
32	PFHR1189Y	GUIDE, THERMAL HEAD (LEFTs)	
33	PFJHS019Z	PRINTER UNIT, THERMAL HEAD	
34	PFHR1190Y	GUIDE, THERMAL HEAD (RIGHT)	
35	PFHR1192X	COVER, THERMAL HEAD	
36	PFHX1462Z	INSULATOR, STATIC ELEC. (RIGHT)	
37	PFQT1666Z	LABEL, BLUE GEAR	
38	Not Used		
39	PFUS1235Z	SPRING, THERMAL HEAD	
40	PFUS1254Z	SPRING, POP UP	
41	PFUS1236Z	SPRING, OPERATION PANEL LOCK	
42	PFUS1233Z	SPRING, CIS	
43	PFJS10Q72Z	CONNECTOR, 10P	
44	PFKM1057W1	CABINET, BODY	
45	PF0U1022Y	PHOTO ELECTRIC TRANSDUCER, IMAGE SENSOR(CIS)	
46	PFHX1344Z	INSULATOR, STATIC ELEC.	
47	Not Used		
48	PFHX1374Z	INSULATOR, CIS	
49	Not Used		
50	Not Used		
51	PFHX1457Z	SPACER, SHEET	
52	PFUS1335Z	SPRING, HEAD A	
53	PFHX1491Z	SPACER, SHEET	
54	PFQT1864Z	LABEL, INK FILM	

11.1.3. BACK COVER SECTION -1

Ref. No.	Part No.	Part Name & Description	Remarks
58	PFUS1385Z	SPRING, SUPPORT RECORDING PAPER	
59	PFHX1513Z	SPACER, SHEET	
60	PFDE1126Z1	LEVER, CASSETTE	
61	PFGT1907Z-J	NAME PLATE(for KX-FM89BX)	
	PFGT1897Z-M	NAME PLATE(for KX-FM89CX)	
62	PFQT1642F	LABEL, PAPER SET	
63	PFUS1238Z	SPRING, PICKUP	
64	PFKS1039Z	TRAY, CASSETTE	
65	PFKV1044W1	COVER, UPPER TURN	
66	PFHG1088Z	RUBBER, PAPER SEPARATION	
67	Not Used		
68	PFUA1035Z	CHASSIS, UPPER TURN	
69	PFUS1333Z	SPRING, EARTH	
70	PFHR1187Z	GUIDE, CORNER (LEFT)	
71	PFHR1188Z	GUIDE, CORNER (RIGHT)	
72	PFDN1042Z	ROLLER, PICKUP	
73	PFDG1163Z	GEAR, PICKUP ROLLER	
74	PFKR1017Z1	GUIDE, DOCUMENT (RIGHT)	
75	PFDR1012Z	ROLLER, SUPPORT	
76	PFUS1234Z	SPRING, EXIT. SUB ROLLER	
77	PFKR1016Z1	GUIDE, DOCUMENT (LEFT)	
78	PFDG1161Z	GEAR, DOCUMENT GUIDE	

11.1.4. BACK COVER SECTION-2

Ref. No.	Part No.	Part Name & Description	Remarks
79	PFDJ1030Z	SPACER, PLATEN (RIGHT)	
80	PFDG1165Y	GEAR, PLATEN	
81	PFDE1130X2	LEVER, LOCK	
82	PFUS1258Z	SPRING, LOCK LEVER	
83	PFHS1029Z	COVER, BACK TENSION SHEET	
84	PFDG1160Z	GEAR, BACK TENSION	
85	PFUS1232Z	SPRING, BACK TENSION	
86	PFDG1164Z	GEAR, PICKUP IDLER	
87	PFDG1166Z	GEAR, PLATEN IDLER	
88	PFDN1041Z	ROLLER, EXIT	
89	PFUS1237Z	SPRING, PAPER TOP	
90	PFDG1162Z	GEAR, EXIT ROLLER	
91	PFDE1128Y	LEVER, PAPER TOP SENSOR	
92	PFDJ1029Z	SPACER, PLATEN (LEFT)	
93	PFDN1043Z	ROLLER, PLATEN	
94	PFQT1817Z	LABEL, OPEN	
95	PFHX1500Z	SPACER, PAPER EXT	
96	PFUS1337Z	SPRING, EARTH LEVER	


11.1.5. LOWER CABINET / P.C.B. SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
100	PFMD1044Z	FRAME, BOTTOM	
101	PFHG1050Z	RUBBER, LEG	
102	PFUS1255Y	SPRING, EARTH	
103	PFJP03S04Z	CONNECTOR, 3P	
104	PQJS02Q59W	CONNECTOR, 2P(for KX-FM89BX)	
	PFJS02R19Y	CONNECTOR, 2P(for KX-FM89CX)	
105	PQLB1E1	INSULATOR, FERRITE CORE	S
106	PQHR945Z	BAND, LEAD BINDER	
107	PFJS07Q67Z	CONNECTOR, 7P	
108	XWC4B	WASHER	
109	Not Used		
110	Not Used		
111	PFDE1129Z	LEVER, PAPER TOP SENSOR	
112	PFBH1014Z1	BUTTON, HOOK	
113	Not Used		
114	PFUS1239Z	SPRING, SPEAKER	
115	PFJS02Q68Z	CONNECTOR, 2P(for KX-FM89BX)	
	PFJS02R60Z	CONNECTOR, 2P(for KX-FM89CX)	
116	PFAS50P003Z	SPEAKER	
117	PFDR1014Z	ROLLER, DOCUMENT SEPARATION	
118	PFDE1133Z	SPACER, DELAY	
119	PFDF1050Z	SHAFT, DOCUMENT SEPARATION	
120	Not Used		
121	Not Used		
122	PFHX1382Z	SPACER	
123	PFQT1250Z	LABEL, CAUTION	
124	Not Used		
125	KR06TT251508	INSULATOR, FERRITE CORE(KX-FM89CX only)	
126	PQHR136Z	BINDER(KX-FM89CX only)	
163	PFMH1082Z	FRAME, PLATE	
164	PFJS11Q71Z	CONNECTOR, 11P	
165	PFHX1456Z	SPACER, SHEET	

11.1.6. MOTOR SECTION

Ref. No.	Part No.	Part Name & Description	Remarks
130	PFDG1155Z	GEAR, E	
131	PFHR1186Z	SPACER, SUPPORT BASE	
132	PFZMFM189E	CHASSIS KIT, GEAR BASE	
133	PFDX1022Z	GEAR, TORQUE LIMITER ASS'Y	
134	PFUS1230Z	SPRING, CAM	
135	PFHR1184Z	ARM, J	
136	PFUS1231Y	SPRING, GEAR I	
137	PFDG1159Z	GEAR, I	
138	PFDG1149Z	GEAR, A	
139	PFDG1152Z	GEAR, CAM	
140	PFDG1158Z	GEAR, H	
141	PFDG1151Z	GEAR, C	
142	PFDG1153Z	GEAR, D1	
143	PFDG1157Z	GEAR, G	
144	PFDG1156Z	GEAR, F	
145	PFHR1183Z	ARM, I	
146	PFJQ35S1S15D	DC MOTOR	S
147	PFDG1154Z	GEAR, D2	
148	PFDG1150Z	GEAR, B	
149	PFMD1043Z	FRAME, GEAR BASE COVER	
150	PFHR1185Z	ARM, V	
151	PFHX1532Z	COVER, GEAR SHEET	
152	PFHX1533Z	COVER, PLATE SHEET	
153	PFUS1382Z	SPRING, GEAR	

11.1.7. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQJA10038Y	POWER CORD	
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PFJA1029Z	CORD, HANDSET	
A4	PFJXE0805Z	HANDSET	
A5	PFKS1056Z1	TRAY, PAPER	S
A6	PFQX1614Z	INSTRUCTION BOOK	
A7	PFQW1646Z	INSTRUCTION BOOK (QUICK START SHEET)(for KX-FM89BX)	
	PFQW1636Z	INSTRUCTION BOOK (QUICK START SHEET)(for KX-FM89CX)	
A8	Not Used		
A9	PFZMFP155M	TRAY ASS'Y,A4 GUIDE	
A10	PFQW1647Z	INSTRUCTION BOOK (ARABIC QUICK REFERENCE GUIDE)(KX-FM89BX only)	
A11	PFJKFM189E	CD-ROM	
P1	PFPK1989Z-M	GIFT BOX(for KX-FM89BX)	
	PFPK1990Z-M	GIFT BOX(for KX-FM89CX)	
P2	PFPN1209Y	CUSHION, RIGHT	
P3	PFPN1208Y	CUSHION, LEFT	
P4	XZB20X35A04	PROTECTION COVER	
P5	PFPH1030Z	PACKING SHEET	
P6	XZB32X45A04	PROTECTION COVER	

11.2. DIGITAL BOARD PARTS

11.2.1. KX-FM89BX

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FM89BX	DIGITAL BOARD ASS'Y (RTL)	
PCB1-1	PFWP2FM89BX	DIGITAL BOARD ASS'Y (RTL) [without ROM]	
		Refer to 9.3 LOWER/P.C.B. SECTION(P. 187).	
		(ICS)	
IC501	PFVIM66429M1	IC	
IC502	PFWIFM89BX	IC (ROM)	
IC503	PFVIMS5148F	IC	S
IC504	PFVIM0525LFF	IC	
IC505	PFVIR675813	IC	
IC507	PFVIXCN4202N	IC	
IC508	PFVIT2003APS	IC	
IC512	PFVIKM29W4AT	IC	
IC513	PFVIMM1385EN	IC	
IC514	AN6383SB	IC	
IC520	PFVISN75189A	IC	
IC521	PFVISN75188E	IC	
		(TRANSISTORS)	
IC506	PFVTSI4431DY	TRANSISTOR(SI)	
Q501	2SB1322	TRANSISTOR(SI)	S
Q502	PQVTDTC114EU	TRANSISTOR(SI)	
Q503	PQVTDTC114EU	TRANSISTOR(SI)	
Q504	2SD1994A	TRANSISTOR(SI)	
Q505	2SD874A	TRANSISTOR(SI)	
Q506	2SD874A	TRANSISTOR(SI)	
Q507	2SC4155S	TRANSISTOR(SI)	
Q508	2SC4155S	TRANSISTOR(SI)	
Q511	2SB709A	TRANSISTOR(SI)	
Q512	PQVTDTC143E	TRANSISTOR(SI)	
Q513	2SC4155S	TRANSISTOR(SI)	
		(DIODES)	
D501	PFVDRMRLS245	DIODE(SI)	
D502	MA7160	DIODE(SI)	
D504	PQVDRLS73T	DIODE(SI)	
D505	PQVDRLS73T	DIODE(SI)	
D506	PQVDRLS73T	DIODE(SI)	
D507	PQVDRLS73T	DIODE(SI)	
D508	PFVDRMRLS245	DIODE(SI)	
DA501	MA141WK	DIODE(SI)	
DA502	MA143	DIODE(SI)	
		(BATTERY)	
BAT501	PFSU1004Z	BATTERY	
		(COILS)	
L501	PQLQR1RM601	COIL	
L502	PQLQR1RM601	COIL	
L503	PQLQR1RM601	COIL	
L504	PQLQR1RM601	COIL	
L505	PQLQR1RM601	COIL	
L506	PQLQR1RM601	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L507	PQLQR1RM601	COIL	
L513	PQLQR1ET	COIL	
L514	PQLQR2KA20T	COIL	
L516	PQLQR2KA113T	COIL	
L517	PQLQR1ET	COIL	
L518	PQLQR2KA20T	COIL	
L519	PQLQR2KA20T	COIL	
L520	PQLQR2KA113T	COIL	
L522	PQLQR2KA20T	COIL	
L523	PQLQR2KA20T	COIL	
L525	PQLQR2KA20T	COIL	
L527	PQLQR2KA20T	COIL	
		(COMPONENTS COMBINATIONS)	
RA501	EXB38V101JV	COMPONENTS PARTS	
RA502	EXB38V101JV	COMPONENTS PARTS	
RA503	EXB38V101JV	COMPONENTS PARTS	
RA504	EXB38V101JV	COMPONENTS PARTS	
RA505	EXB38V101JV	COMPONENTS PARTS	
RA506	EXB38V101JV	COMPONENTS PARTS	
		(CONNECTORS)	
CN501	PQJP17A19Z	CONNECTOR,17PIN	
CN502	PQJP5G30Z	CONNECTOR,5PIN	
CN503	PQJP10G30Z	CONNECTOR,11PIN	
CN504	PQJP11G30Z	CONNECTOR,11PIN	
CN505	PQJP11G100Z	CONNECTOR,11PIN	
CN506	PQJP7G30Z	CONNECTOR,7PIN	
CN507	PQJP10A19Z	CONNECTOR,10PIN	
CN508	PFJP11A12Z	CONNECTOR, 11PIN	
CN509	PQJP3G30Z	CONNECTOR,3PIN	
		(SWITCH)	
SW501	PFSH1A001Z	SWITCH FILM & COVER DETECTION	
		(CRYSTAL OSCILLATIONS)	
X501	PFVCCFS32Z	CRYSTAL OSCILLATOR	
X502	PQVCJ2400N5Z	CRYSTAL OSCILLATOR	
X503	PFVC32256ZAT	CRYSTAL OSCILLATOR	
		(FUSE)	
F501	PFRB001251KC	FUSE	
F502	PFRB002122KZ	FUSE	
		(PHOTO ELECTRIC TRANSDUCER)	
PS501	PFVISG257	PHOTO ELECTRIC TRANSDUCER	
		(RESISTORS)	

Ref. No.	Part No.	Part Name & Description	Remarks
L508	ERJ3GEYJ101	0	
L509	ERJ3GEYJ101	0	
L510	ERJ3GEYJ101	0	
L511	ERJ3GEYJ101	0	
L512	ERJ3GEYJ101	0	
L515	PQ4R18XJ100	0	
L521	ERJ8GEY0R00	0	
L524	PQ4R18XJ220	0	
L526	ERJ3GEY0R00	0	
R501	ERJ3GEY0R00	0	
R502	ERJ3GEY0R00	0	
R503	ERJ3GEY0R00	0	
R504	PQ4R10XJ102	1k	S
R505	ERJ3GEYJ562	5.6k	
R506	ERJ3GEYJ472	4.7k	
R507	ERJ3GEY0R00	0	
R508	ERJ3GEY0R00	0	
R509	ERJ3GEYJ101	100	
R510	ERJ3GEY0R00	0	
R511	ERJ3GEY0R00	0	
R512	ERJ3GEYJ821	820	
R513	ERDS1VJ152	1.5k	
R514	ERJ3GEYJ223	22k	
R515	ERJ3GEYJ823	82k	
R516	PQ4R10XJ220	22	S
R517	ERJ3GEYJ101	100	
R518	ERJ3GEYJ682	6.8k	
R519	ERJ3GEYJ822	8.2k	
R520	ERJ3GEYJ103	10k	
R521	PQ4R10XJ4R7	4.7	S
R522	ERJ3GEYJ472	4.7k	
R523	ERJ3GEYJ682	6.8k	
R524	ERJ3GEYJ153	15k	
R525	PQ4R10XJ150	15	S
R526	ERJ3GEY0R00	0	
R527	ERJ3GEYJ103	10k	
R528	ERJ3GEYJ392	3.9k	
R529	ERJ3GEYJ203	20k	
R530	ERJ3GEYJ392	3.9k	
R531	ERJ3GEY0R00	0	
R533	ERJ3GEYJ102	1k	
R534	ERJ3GEYJ471	470	
R535	ERJ3GEYJ101	100	
R536	ERJ3GEYJ101	100	
R537	ERJ3GEYJ101	100	
R538	ERJ3GEYJ101	100	
R539	ERJ3GEYJ102	1k	
R540	ERJ3GEYJ102	1k	
R541	ERJ3GEYJ473	47k	
R542	ERJ3GEYJ473	47k	
R543	ERJ3GEYJ222	2.2k	
R544	ERJ3GEYJ222	2.2k	
R546	ERJ3GEYJ472	4.7k	
R547	ERJ3EKF1101	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R548	ERJ3EKF4701	0	
R549	ERJ3GEYJ104	100k	
R550	ERJ3GEYJ101	100	
R551	ERJ3GEYJ102	1k	
R552	ERJ3GEYJ101	100	
R553	ERJ3GEY0R00	0	
R554	ERJ3GEYJ101	100	
R555	ERJ3GEYJ105	1M	
R556	ERJ3GEYJ103	10k	
R557	ERJ3GEYJ103	10k	
R558	PQ4R18XJ8R2	8.2	
R559	ERJ3GEYJ103	10k	
R560	ERJ3GEYJ101	100	
R561	ERJ3GEYJ103	10k	
R562	ERJ3GEYJ472	4.7k	
R563	ERJ3GEY0R00	0	
R564	ERJ3GEYJ474	470k	
R565	ERJ3GEYJ101	100	
R566	ERJ3GEYJ101	100	
R568	ERJ3GEYJ101	100	
R569	ERJ3GEYJ124	120k	
R570	ERJ3GEYJ104	100k	
R572	ERJ3GEYJ823	82k	
R573	ERJ3GEYJ103	10k	
R574	ERJ3GEYJ183	18k	
R575	ERJ3GEYJ104	100k	
R576	ERJ3GEYJ822	8.2k	
R577	ERJ3GEYJ183	18k	
R578	ERJ3GEYJ183	18k	
R579	ERJ3GEYJ154	150k	
R580	ERJ3GEYJ184	180k	
R581	ERJ3GEYJ103	10k	
R582	ERJ3GEYJ4R7	4.7	
R584	ERJ3GEYJ103	10k	
R587	ERJ3GEYJ103	10k	
R591	ERJ3GEYJ222	2.2k	
R592	ERJ3GEYJ102	1k	
R593	ERJ3GEY0R00	0	
R594	ERJ3GEYJ103	10k	
R595	ERJ3GEYJ331	330	
R596	ERJ3GEYJ105	1M	
R598	ERJ3GEY0R00	0	
R599	ERJ3GEYJ563	56k	
R600	ERJ3GEYJ102	1k	
R601	ERJ3GEYJ222	2.2k	
R602	ERJ3GEYJ562	5.6k	
R603	ERJ3GEY0R00	0	
R604	ERJ3GEYJ272	2.7k	
R605	ERJ3GEYJ123	12k	
R606	ERJ3GEYJ101	100	
R607	ERJ3GEYJ472	4.7k	
R609	ERJ3GEYJ103	10k	
R610	ERJ3GEYJ103	10k	
R611	ERJ3GEYJ102	1k	

Ref. No.	Part No.	Part Name & Description	Remarks
R612	ERJ3GEYJ273	27k	
R616	ERJ3GEYJ103	10k	
R617	ERJ3GEYJ104	100k	
R620	ERJ3GEY0R00	0	
R621	ERJ3GEYJ224	220k	
R622	ERJ3GEYJ224	220k	
R626	ERJ1WYJ391	390	
R628	ERJ3GEYJ102	1k	
R631	ERJ8GEY0R00	0	
R632	ERJ6GEY0R00	0	
R633	ERJ3GEYJ122	1.2k	
R635	ERJ3GEY0R00	0	
R636	ERJ3GEY0R00	0	
R637	ERJ3GEY0R00	0	
R638	ERJ3GEY0R00	0	
R639	ERJ3GEY0R00	0	
R640	ERJ3GEY0R00	0	
		(CAPACITORS)	
C501	ECUV1H120JCV	12P	
C502	PQCUV1H473MD	0.047	S
C508	ECUV1H104ZFV	0.1	S
C509	ECEA1CK101	100	S
C510	ECUV1H561JCV	560P	
C511	ECUV1H104ZFV	0.1	S
C512	ECUV1H104ZFV	0.1	S
C513	ECUV1H104ZFV	0.1	S
C514	ECEA1VKA330	33	
C515	ECUV1H102KBV	0.001	
C516	ECEA1VKA330	33	
C517	ECUV1H104ZFV	0.1	S
C518	ECUV1H104ZFV	0.1	S
C519	ECUV1H104ZFV	0.1	S
C520	ECUV1H104ZFV	0.1	S
C522	ECUV1H104ZFV	0.1	S
C523	ECUV1H104ZFV	0.1	S
C524	ECEA1VKA100	10	
C525	ECUV1H104ZFV	0.1	S
C527	ECUV1H222KBV	0.0022	
C528	ECUV1C104KBV	0.1	
C529	ECUV1C104KBV	0.1	
C531	ECUV1H150JCV	15P	
C532	ECUV1H104ZFV	0.1	S
C533	ECUV1H104ZFV	0.1	S
C534	ECUV1H150JCV	15P	
C535	ECUV1H104ZFV	0.1	S
C537	ECUV1H104ZFV	0.1	S
C538	ECUV1H104ZFV	0.1	S
C539	ECUV1H104ZFV	0.1	S
C540	ECUV1H104ZFV	0.1	S
C541	ECUV1H102KBV	0.001	
C542	ECUV1H102KBV	0.001	
C543	ECUV1H104ZFV	0.1	S
C544	ECUV1H104ZFV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C546	ECUV1H104ZFV	0.1	S
C547	ECUV1H104ZFV	0.1	S
C548	ECUV1H104ZFV	0.1	S
C549	ECUV1H104ZFV	0.1	S
C550	ECUV1H104ZFV	0.1	S
C551	ERJ3GEY0R00	0	
C552	ECUV1H150JCV	15P	S
C554	ECUV1H150JCV	15P	S
C555	ECEA1CKS100	10	S
C556	ECUV1H104ZFV	0.1	S
C557	ECUV1C104KBV	0.1	
C558	ECUV1H104ZFV	0.1	S
C559	ECUV1H120JCV	12P	
C560	ECUV1H103KBV	0.01	
C561	ECUV1H100DCV	10P	S
C562	ECUV1H472KBV	0.0047	
C563	ECUV1H472KBV	0.0047	
C564	ECUV1H104ZFV	0.1	S
C565	PQCUV1C224KB	0.22	
C566	ECUV1H104ZFV	0.1	S
C567	ECUV1H104ZFV	0.1	S
C568	ECUV1H330JCV	33P	
C569	ECEA0JK221	220	S
C570	ECUV1C104KBV	0.1	
C571	ECUV1H681KBV	680P	
C572	ECUV1H681KBV	680P	
C573	ECUV1H681KBV	680P	
C574	PQCUV1C224KB	0.22	
C575	ECUV1H104ZFV	0.1	S
C576	ECEA0JK221	220	S
C577	ECUV1H680JCV	68P	
C580	ECEA1CKS100	10	S
C581	ECUV1H181JCV	180P	
C582	ECUV1H102KBV	0.0012	
C583	ECUV1H104ZFV	0.1	S
C584	ECUV1C104KBV	0.1	
C585	ECUV1C473KBV	0.047	
C586	PQCUV1C224KB	0.22	
C587	ECUV1C473KBV	0.047	
C588	ECUV1H104ZFV	0.1	S
C589	ECUV1H104ZFV	0.1	S
C590	ECUV1H561JCV	560P	S
C591	ECUV1H151JCV	150P	
C593	ECUV1H104ZFV	0.1	S
C596	ECEA0JK221	220	S
C601	ECUV1C104KBV	0.1	
C602	ECEA1CKS100	10	S
C603	ECUV1H104ZFV	0.1	S
C604	ECUV1H104ZFV	0.1	S
C605	ECEA1CKS100	10	S
C606	ECEA1CKS100	10	
C607	ECUV1H104ZFV	0.1	S
C608	ECUV1H104ZFV	0.1	S
C609	ECEA1CKS100	10	

Ref. No.	Part No.	Part Name & Description	Remarks
C610	ECUV1H104ZFV	0.1	S
C611	ECUV1C104KBV	0.1	
C612	ECUV1H102KBV	0.001	
C613	ECUV1H101JCV	100P	
C614	ECUV1H104ZFV	0.1	S
C615	ECUV1C393KBV	0.039	
C616	ECUV1C104KBV	0.1	
C617	ECUV1H102KBV	0.001	
C618	ECEA1CKS100	10	S
C619	ECEA1CKS100	10	
C620	ECUV1H104ZFV	0.1	S
C621	ECUV1H104ZFV	0.1	S
C622	ECUV1H103KBV	0.01	
C624	ECUV1H104ZFV	0.1	S
C626	ECUV1H102KBV	0.001	
C627	ECUV1C104KBV	0.1	
C628	ECUV1H333KDV	0.033	S
C630	ECUV1C104KBV	0.1	
C633	ECUV1C104KBV	0.1	
C634	ECUV1H104ZFV	0.1	S
C635	PQCUV1H104ZF	0.1	
C636	ECUV1H104ZFV	0.1	S
C638	ECUV1H104ZFV	0.1	S
C639	ECUV1H104ZFV	0.1	S

11.2.2. KX-FM89CX

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWP1FM89CX	DIGITAL BOARD ASS'Y (RTL)	
PCB1-1	PFWP2FM89CX	DIGITAL BOARD ASS'Y (RTL) [without ROM]	
		Refer to 9.3 LOWER/P.C.B. SECTION(P. 187).	
		(ICS)	
IC501	PFVIM66429M1	IC	
IC502	PFWIFM89CX	IC (ROM)	
IC503	PFVIMS5148F	IC	S
IC504	PFVIM0525LFF	IC	
IC505	PFVIR675813	IC	
IC507	PFVIXCN4202N	IC	
IC508	PFVIT2003APS	IC	
IC512	PFVIKM29W4AT	IC	
IC513	PFVIMM1385EN	IC	
IC514	AN6383SB	IC	
IC520	PFVISN75189A	IC	
IC521	PFVISN75188E	IC	
		(TRANSISTORS)	
IC506	PFVTSI4431DY	TRANSISTOR(SI)	
Q501	2SB1322	TRANSISTOR(SI)	S
Q502	PQVTDTC114EU	TRANSISTOR(SI)	
Q503	PQVTDTC114EU	TRANSISTOR(SI)	
Q504	2SD1994A	TRANSISTOR(SI)	

Ref. No.	Part No.	Part Name & Description	Remarks
Q505	2SD874A	TRANSISTOR(SI)	
Q506	2SD874A	TRANSISTOR(SI)	
Q507	2SC4155S	TRANSISTOR(SI)	
Q508	2SC4155S	TRANSISTOR(SI)	
Q511	2SB709A	TRANSISTOR(SI)	
Q512	PQVDTTC143E	TRANSISTOR(SI)	
Q513	2SC4155S	TRANSISTOR(SI)	
		(DIODES)	
D501	PFVDRMRLS245	DIODE(SI)	
D502	MA7160	DIODE(SI)	
D504	PQVDRLS73T	DIODE(SI)	
D505	PQVDRLS73T	DIODE(SI)	
D506	PQVDRLS73T	DIODE(SI)	
D507	PQVDRLS73T	DIODE(SI)	
D508	PFVDRMRLS245	DIODE(SI)	
DA501	MA141WK	DIODE(SI)	
DA502	MA143	DIODE(SI)	
		(BATTERY)	
BAT501	PFSU1004Z	BATTERY	
		(COILS)	
L501	PQLQR1RM601	COIL	
L502	PQLQR1RM601	COIL	
L503	PQLQR1RM601	COIL	
L504	PQLQR1RM601	COIL	
L505	PQLQR1RM601	COIL	
L506	PQLQR1RM601	COIL	
L507	PQLQR1RM601	COIL	
L513	PQLQR1ET	COIL	
L514	PQLQR2KA20T	COIL	
L516	PQLQR2KA113T	COIL	
L517	PQLQR1ET	COIL	
L518	PQLQR2KA20T	COIL	
L519	PQLQR2KA20T	COIL	
L520	PQLQR2KA113T	COIL	
L522	PQLQR2KA20T	COIL	
L523	PQLQR2KA20T	COIL	
L525	PQLQR2KA20T	COIL	
L527	PQLQR2KA20T	COIL	
		(COMPONENTS COMBINATIONS)	
RA501	EXB38V101JV	COMPONENTS PARTS	
RA502	EXB38V101JV	COMPONENTS PARTS	
RA503	EXB38V101JV	COMPONENTS PARTS	
RA504	EXB38V101JV	COMPONENTS PARTS	
RA505	EXB38V101JV	COMPONENTS PARTS	
RA506	EXB38V101JV	COMPONENTS PARTS	
		(CONNECTORS)	
CN501	PQJP17A19Z	CONNECTOR,17PIN	
CN502	PQJP5G30Z	CONNECTOR,5PIN	

Ref. No.	Part No.	Part Name & Description	Remarks
CN503	PQJP10G30Z	CONNECTOR,11PIN	
CN504	PQJP11G30Z	CONNECTOR,11PIN	
CN505	PQJP11G100Z	CONNECTOR,11PIN	
CN506	PQJP7G30Z	CONNECTOR,7PIN	
CN507	PQJP10A19Z	CONNECTOR,10PIN	
CN508	PFJP11A12Z	CONNECTOR, 11PIN	
CN509	PQJP3G30Z	CONNECTOR,3PIN	
		(SWITCH)	
SW501	PFSH1A001Z	SWITCH FILM & COVER DETECTION	
		(CRYSTAL OSCILLATIONS)	
X501	PFVCCFS32Z	CRYSTAL OSCILLATOR	
X502	PQVCJ2400N5Z	CRYSTAL OSCILLATOR	
X503	PFVC32256ZAT	CRYSTAL OSCILLATOR	
		(FUSE)	
F501	PFRB001251KC	FUSE	
F502	PFRB002122KZ	FUSE	
		(PHOTO ELECTRIC TRANSDUCER)	
PS501	PFVISG257	PHOTO ELECTRIC TRANSDUCER	
		(RESISTORS)	
L508	ERJ3GEYJ101	0	
L509	ERJ3GEYJ101	0	
L510	ERJ3GEYJ101	0	
L511	ERJ3GEYJ101	0	
L512	ERJ3GEYJ101	0	
L515	PQ4R18XJ100	0	
L521	ERJ8GEY0R00	0	
L524	PQ4R18XJ220	0	
L526	ERJ3GEY0R00	0	
R501	ERJ3GEY0R00	0	
R502	ERJ3GEY0R00	0	
R503	ERJ3GEY0R00	0	
R504	PQ4R10XJ102	1k	S
R505	ERJ3GEYJ562	5.6k	
R506	ERJ3GEYJ472	4.7k	
R507	ERJ3GEY0R00	0	
R508	ERJ3GEY0R00	0	
R509	ERJ3GEYJ101	100	
R510	ERJ3GEY0R00	0	
R511	ERJ3GEY0R00	0	
R512	ERJ3GEYJ821	820	
R513	ERDS1VJ152	1.5k	
R514	ERJ3GEYJ223	22k	
R515	ERJ3GEYJ823	82k	
R516	PQ4R10XJ220	22	S

Ref. No.	Part No.	Part Name & Description	Remarks
R517	ERJ3GEYJ101	100	
R518	ERJ3GEYJ682	6.8k	
R519	ERJ3GEYJ822	8.2k	
R520	ERJ3GEYJ103	10k	
R521	PQ4R10XJ4R7	4.7	S
R522	ERJ3GEYJ472	4.7k	
R523	ERJ3GEYJ682	6.8k	
R524	ERJ3GEYJ153	15k	
R525	PQ4R10XJ150	15	S
R526	ERJ3GEY0R00	0	
R527	ERJ3GEYJ103	10k	
R528	ERJ3GEYJ392	3.9k	
R529	ERJ3GEYJ203	20k	
R530	ERJ3GEYJ392	3.9k	
R531	ERJ3GEY0R00	0	
R533	ERJ3GEYJ102	1k	
R534	ERJ3GEYJ471	470	
R535	ERJ3GEYJ101	100	
R536	ERJ3GEYJ101	100	
R537	ERJ3GEYJ101	100	
R538	ERJ3GEYJ101	100	
R539	ERJ3GEYJ102	1k	
R540	ERJ3GEYJ102	1k	
R541	ERJ3GEYJ473	47k	
R542	ERJ3GEYJ473	47k	
R543	ERJ3GEYJ222	2.2k	
R544	ERJ3GEYJ222	2.2k	
R546	ERJ3GEYJ472	4.7k	
R547	ERJ3EKF1101	0	
R548	ERJ3EKF4701	0	
R549	ERJ3GEYJ104	100k	
R550	ERJ3GEYJ101	100	
R551	ERJ3GEYJ102	1k	
R552	ERJ3GEYJ101	100	
R553	ERJ3GEY0R00	0	
R554	ERJ3GEYJ101	100	
R555	ERJ3GEYJ105	1M	
R556	ERJ3GEYJ103	10k	
R557	ERJ3GEYJ103	10k	
R558	PQ4R18XJ8R2	8.2	
R559	ERJ3GEYJ103	10k	
R560	ERJ3GEYJ101	100	
R561	ERJ3GEYJ103	10k	
R562	ERJ3GEYJ472	4.7k	
R563	ERJ3GEY0R00	0	
R564	ERJ3GEYJ474	470k	
R565	ERJ3GEYJ101	100	
R566	ERJ3GEYJ101	100	
R568	ERJ3GEYJ101	100	
R569	ERJ3GEYJ124	120k	
R570	ERJ3GEYJ104	100k	
R572	ERJ3GEYJ823	82k	
R573	ERJ3GEYJ103	10k	
R574	ERJ3GEYJ183	18k	





Ref. No.	Part No.	Part Name & Description	Remarks
R575	ERJ3GEYJ563	56k	
R576	ERJ3GEYJ822	8.2k	
R577	ERJ3GEYJ183	18k	
R578	ERJ3GEYJ183	18k	
R579	ERJ3GEYJ304	300k	
R580	ERJ3GEYJ184	180k	
R581	ERJ3GEYJ103	10k	
R582	ERJ3GEYJ4R7	4.7	
R584	ERJ3GEYJ103	10k	
R587	ERJ3GEYJ103	10k	
R591	ERJ3GEYJ222	2.2k	
R592	ERJ3GEYJ102	1k	
R593	ERJ3GEY0R00	0	
R594	ERJ3GEYJ103	10k	
R595	ERJ3GEYJ331	330	
R596	ERJ3GEYJ105	1M	
R598	ERJ3GEY0R00	0	
R599	ERJ3GEYJ563	56k	
R600	ERJ3GEYJ102	1k	
R601	ERJ3GEYJ222	2.2k	
R602	ERJ3GEYJ562	5.6k	
R603	ERJ3GEY0R00	0	
R604	ERJ3GEYJ272	2.7k	
R605	ERJ3GEYJ123	12k	
R606	ERJ3GEYJ101	100	
R607	ERJ3GEYJ472	4.7k	
R609	ERJ3GEYJ103	10k	
R610	ERJ3GEYJ103	10k	
R611	ERJ3GEYJ102	1k	
R612	ERJ3GEYJ273	27k	
R616	ERJ3GEYJ103	10k	
R617	ERJ3GEYJ104	100k	
R620	ERJ3GEY0R00	0	
R621	ERJ3GEYJ224	220k	
R622	ERJ3GEYJ224	220k	
R626	ERJ1WYJ391	390	
R628	ERJ3GEYJ102	1k	
R631	ERJ8GEY0R00	0	
R632	ERJ6GEY0R00	0	
R633	ERJ3GEYJ122	1.2k	
R635	ERJ3GEY0R00	0	
R636	ERJ3GEY0R00	0	
R637	ERJ3GEY0R00	0	
R638	ERJ3GEY0R00	0	
R639	ERJ3GEY0R00	0	
R640	ERJ3GEY0R00	0	
		(CAPACITORS)	
C501	ECUV1H120JCV	12P	
C502	PQCUV1H473MD	0.047	S
C508	ECUV1H104ZFV	0.1	S
C509	ECEA1CK101	100	S
C510	ECUV1H561JCV	560P	
C511	ECUV1H104ZFV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C512	ECUV1H104ZFV	0.1	S
C513	ECUV1H104ZFV	0.1	S
C514	ECEA1VKA330	33	
C515	ECUV1H102KBV	0.001	
C516	ECEA1VKA330	33	
C517	ECUV1H104ZFV	0.1	S
C518	ECUV1H104ZFV	0.1	S
C519	ECUV1H104ZFV	0.1	S
C520	ECUV1H104ZFV	0.1	S
C522	ECUV1H104ZFV	0.1	S
C523	ECUV1H104ZFV	0.1	S
C524	ECEA1VKA100	10	
C525	ECUV1H104ZFV	0.1	S
C527	ECUV1H222KBV	0.0022	
C528	ECUV1C104KBV	0.1	
C529	ECUV1C104KBV	0.1	
C531	ECUV1H150JCV	15P	
C532	ECUV1H104ZFV	0.1	S
C533	ECUV1H104ZFV	0.1	S
C534	ECUV1H150JCV	15P	
C535	ECUV1H104ZFV	0.1	S
C537	ECUV1H104ZFV	0.1	S
C538	ECUV1H104ZFV	0.1	S
C539	ECUV1H104ZFV	0.1	S
C540	ECUV1H104ZFV	0.1	S
C541	ECUV1H102KBV	0.001	
C542	ECUV1H102KBV	0.001	
C543	ECUV1H104ZFV	0.1	S
C544	ECUV1H104ZFV	0.1	S
C546	ECUV1H104ZFV	0.1	S
C547	ECUV1H104ZFV	0.1	S
C548	ECUV1H104ZFV	0.1	S
C549	ECUV1H104ZFV	0.1	S
C550	ECUV1H104ZFV	0.1	S
C551	ERJ3GEY0R00	0	
C552	ECUV1H150JCV	15P	S
C554	ECUV1H150JCV	15P	S
C555	ECEA1CKS100	10	S
C556	ECUV1H104ZFV	0.1	S
C557	ECUV1C104KBV	0.1	
C558	ECUV1H104ZFV	0.1	S
C559	ECUV1H120JCV	12P	
C560	ECUV1H103KBV	0.01	
C561	ECUV1H100DCV	10P	S
C562	ECUV1H472KBV	0.0047	
C563	ECUV1H472KBV	0.0047	
C564	ECUV1H104ZFV	0.1	S
C565	PQCUV1C224KB	0.22	
C566	ECUV1H104ZFV	0.1	S
C567	ECUV1H104ZFV	0.1	S
C568	ECUV1H330JCV	33P	
C569	ECEA0JK221	220	S
C570	ECUV1C104KBV	0.1	
C571	ECUV1H681KBV	680P	

Ref. No.	Part No.	Part Name & Description	Remarks
C572	ECUV1H681KBV	680P	
C573	ECUV1H681KBV	680P	
C574	PQCUV1C224KB	0.22	
C575	ECUV1H104ZFV	0.1	S
C576	ECEA0JK221	220	S
C577	ECUV1H680JCV	68P	
C580	ECEA1CKS100	10	S
C581	ECUV1H181JCV	180P	
C582	ECUV1H182KBV	0.0018	
C583	ECUV1H104ZFV	0.1	S
C584	ECUV1C104KBV	0.1	
C585	ECUV1C473KBV	0.047	
C586	PQCUV1C224KB	0.22	
C587	ECUV1C473KBV	0.047	
C588	ECUV1H104ZFV	0.1	S
C589	ECUV1H104ZFV	0.1	S
C590	ECUV1H271KBV	270P	S
C591	ECUV1H151JCV	150P	
C593	ECUV1H104ZFV	0.1	S
C596	ECEA0JK221	220	S
C601	ECUV1C104KBV	0.1	
C602	ECEA1CKS100	10	S
C603	ECUV1H104ZFV	0.1	S
C604	ECUV1H104ZFV	0.1	S
C605	ECEA1CKS100	10	S
C606	ECEA1CKS100	10	
C607	ECUV1H104ZFV	0.1	S
C608	ECUV1H104ZFV	0.1	S
C609	ECEA1CKS100	10	
C610	ECUV1H104ZFV	0.1	S
C611	ECUV1C104KBV	0.1	
C612	ECUV1H102KBV	0.001	
C613	ECUV1H101JCV	100P	
C614	ECUV1H104ZFV	0.1	S
C615	ECUV1C393KBV	0.039	
C616	ECUV1C104KBV	0.1	
C617	ECUV1H102KBV	0.001	
C618	ECEA1CKS100	10	S
C619	ECEA1CKS100	10	
C620	ECUV1H104ZFV	0.1	S
C621	ECUV1H104ZFV	0.1	S
C622	ECUV1H103KBV	0.01	
C624	ECUV1H104ZFV	0.1	S
C626	ECUV1H102KBV	0.001	
C627	ECUV1C104KBV	0.1	
C628	ECUV1H333KDV	0.033	S
C630	ECUV1C104KBV	0.1	
C633	ECUV1C104KBV	0.1	
C634	ECUV1H104ZFV	0.1	S
C635	PQCUV1H104ZF	0.1	
C636	ECUV1H104ZFV	0.1	S
C638	ECUV1H104ZFV	0.1	S
C639	ECUV1H104ZFV	0.1	S

11.3. ANALOG BOARD PARTS





11.3.1. KX-FM89BX

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFWP3FM89BX	ANALOG BOARD ASS'Y (RTL)	
		Refer to 9.3 LOWER/P.C.B. SECTION(P. 187).	
		(ICS)	
IC101	PQVINJM4558M	IC	
IC102	PQVIMC34119M	IC	S
		(TRANSISTORS)	
Q105	2SC2235	TRANSISTOR(SI)	
Q111	2SC4155S	TRANSISTOR(SI)	
Q115	PQVTDTC143E	TRANSISTOR(SI)	
Q124	2SC4155S	TRANSISTOR(SI)	
		(DIODES)	
D102	MA4056	DIODE(SI)	
D107	MA4056	DIODE(SI)	
D108	MA4056	DIODE(SI)	
D115	1SS119	DIODE(SI)	
D117	1SS119	DIODE(SI)	
D118	PFVDDGS1ZB60	DIODE(SI)	
D125	1SS119	DIODE(SI)	
D126	1SS119	DIODE(SI)	
		(COILS)	
FLT101	PFLE003	COIL	S
L105	PFVF2B182SDT	COIL	
L106	PFVF2B182SDT	COIL	
L108	PQLQR2KA113T	COIL	
L111	PQLQR2KA113T	COIL	
		(CONNECTORS)	
CN105	PQJP02G100Z	CONNECTOR,2PIN	
CN106	PQJS10A10Z	CONNECTOR,10PIN	
		(JACKS)	
CN102	PFJJ1T01Z	JACK/SOCKET	
CN104	PQJJ1TB18Z	JACK/SOCKET	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC102	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	S 
PC104	0N3131SKU	PHOTO ELECTRIC TRANSDUCER	
PC107	CNC7S102	PHOTO ELECTRIC TRANSDUCER	
		(SWITCHES)	
SW101	ESE14A211	SWITCH	
SW102	PFSH1A002Z	SWITCH	

Ref. No.	Part No.	Part Name & Description	Remarks
		(VARISTORS)	
SA101	PFRZRA311P6T	VARISTOR	
SA102	PFVDRA102M	VARISTOR	S
ZNR101	ERZVA7D121	VARISTOR	
		(COMPONENTS PARTS)	
L107	EXCELD35	COMPONENTS PARTS	
		(THERMISTOR)	
POS101	PFRT002	THERMISTOR	
		(RELAY)	
RL101	PFSL001Z	RELAY	
		(TRANSFORMER)	
T101	PQLT8E7A	TRANSFORMER	
T102	PFLT8D007	TRANSFORMER	
		(RESISTORS)	
L109	ERJ3GEYJ330	33	
L110	ERJ3GEYJ330	33	
R111	ERJ3GEYJ473	47k	
R113	ERJ3GEYJ104	100k	
R114	ERJ3GEYJ104	100k	
R115	ERJ3GEYJ563	56k	
R116	ERJ3GEYJ563	56k	
R118	ERJ3GEY0R00	0	
R122	ERJ3GEYJ274	270k	
R125	ERJ3GEYJ562	5.6k	
R128	ERJ3GEYJ103	10k	
R131	ERJ3GEYJ101	100	
R134	ERJ3GEYJ223	22k	
R135	ERJ3GEYJ472	4.7k	
R136	ERJ3GEY0R00	0	
R137	ERJ3GEY0R00	0	
R138	ERJ3GEYJ102	1k	
R141	ERJ3GEYJ101	100	
R142	ERJ3GEYJ472	4.7k	
R143	ERJ3GEYJ103	10k	
R144	ERJ3GEYJ103	10k	
R151	ERJ3GEYJ222	2.2k	
R153	ERJ3GEYJ562	5.6k	
R156	ERJ3GEYJ153	15k	
R158	ERDS2TJ331	330	
R159	ERJ3GEYJ103	10k	
R164	ERJ3GEYJ153	15k	
R169	ERJ3GEYJ103	10k	
R174	ERJ3GEYJ473	47k	
R175	ERJ3GEYJ154	150k	
R176	ERJ3GEYJ114	110k	
R177	ERJ3GEYJ822	8.2k	

Ref. No.	Part No.	Part Name & Description	Remarks
R182	ERJ3GEYJ682	6.8k	
R184	PQ4R10XJ103	10k	S
R185	PQ4R10XJ393	39k	S
R196	ERJ3GEYJ332	3.3k	
R202	ERDS1TJ473	47k	
R212	ERJ3GEYJ331	330	
R213	ERJ3GEYJ152	1.5k	
R214	ERJ3GEYJ152	1.5k	
R215	ERDS1TJ473	47k	
R216	ERJ3GEYJ273	27k	
R230	ERJ3GEYJ103	10k	
		(CAPACITORS)	
C110	ECUV1C104KBV	0.1	
C113	ECUV1E225ZF	2.2	
C116	ECUV1H181JCV	180P	
C117	PQCUV1H104ZF	0.1	
C119	ECUV1H181JCV	180P	
C126	ECUV1H680JCV	68P	
C129	ECUV1C104KBV	0.1	
C130	ECUV1C104KBV	0.1	
C133	PQCUV1H123MD	0.012	S
C135	ECUV1H103KBV	0.01	
C136	ECEA1HKS4R7	4.7	
C144	ECUV1C104KBV	0.1	
C146	ECUV1H103KBV	0.01	
C147	ECUV1C104KBV	0.1	
C149	PQCUV1H104ZF	0.1	
C150	ECEA1HKS100	10	S
C153	ECEA1HKS4R7	4.7	
C159	ECEA1CKS100	10	
C161	ECUV1H183KBV	0.018	
C162	ECUV1H333KDV	0.033	S
C165	ECEA1HKS4R7	4.7	
C167	ECUV1H102KBV	0.001	
C171	ECEA1CKS100	10	
C172	ECA1CM221	220	
C179	ECKD2H681KB	680P	S
C180	ECKD2H681KB	680P	S
C190	ERJ6GEY0R00	0	
C198	ECQE2E334KZ	0.33	S
C207	ECEA1CKS470	47	S
C212	ECUV1E225ZF	2.2	
C214	ECUV1H103KBV	0.01	
C222	PQCUV1H104ZF	0.1	
C223	ECEA1HKS100	10	S
C224	ECUV1H681KBV	680P	
C225	ECUV1H681KBV	680P	

11.3.2. KX-FM89CX

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFWP3FM89CX	ANALOG BOARD ASS'Y (RTL)	
		Refer to 9.3 LOWER/P.C.B. SECTION(P. 199).	
		(ICS)	
IC101	PQVINJM4558M	IC	
IC102	PQVIMC34119M	IC	S
		(TRANSISTORS)	
Q105	2SC2235	TRANSISTOR(SI)	
Q108	PQVTDTC143E	TRANSISTOR(SI)	
Q111	2SC4155S	TRANSISTOR(SI)	
Q115	PQVTDTC143E	TRANSISTOR(SI)	
Q124	2SC4155S	TRANSISTOR(SI)	
		(DIODES)	
D102	MA4056	DIODE(SI)	
D107	MA4056	DIODE(SI)	
D108	MA4056	DIODE(SI)	
D109	1SS119	DIODE(SI)	
D111	PQVDHZS2B1	DIODE(SI)	
D115	1SS119	DIODE(SI)	
D117	1SS119	DIODE(SI)	
D118	PFVDDGS1ZB60	DIODE(SI)	
D121	MA4056	DIODE(SI)	
D122	MA4056	DIODE(SI)	
D125	1SS119	DIODE(SI)	
D126	1SS119	DIODE(SI)	
		(COILS)	
FLT101	PFLE003	COIL	S
FLT103	PFLE126	COIL	
L108	PQLQR2KA113T	COIL	
L109	PQLQR2KA113T	COIL	
L110	PQLQR2KA113T	COIL	
L111	PQLQR2KA113T	COIL	
L126	PQLQR2KA20T	COIL	
L127	PQLQR2KA20T	COIL	
L128	PQLQR2KA20T	COIL	
L129	PQLQR2KA20T	COIL	
		(CONNECTORS)	
CN101	PQJS17A10Z	CONNECTOR,17PIN	
CN105	PQJP02G100Z	CONNECTOR,2PIN	
CN106	PQJS10A10Z	CONNECTOR,10PIN	
		(JACKS)	
CN102	PFJJ1T01Z	JACK/SOCKET	
CN104	PQJJ1TB18Z	JACK/SOCKET	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC102	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	 S
PC104	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	
PC106	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	

Ref. No.	Part No.	Part Name & Description	Remarks
PC107	PQVIPC817CD	PHOTO ELECTRIC TRANSDUCER	⚠
		(SWITCHES)	
SW101	ESE14A211	PUSH SWITCH	
SW102	PFSH1A002Z	SWITCH	
		(VARISTORS)	
SA101	PFRZRA311P6T	VARISTOR	⚠
SA102	PFRZ001Z	VARISTOR	⚠
ZNR101	ERZVA7D121	VARISTOR	
		(COMPONENTS PARTS)	
L107	EXCELD35	COMPONENTS PARTS	
		(THERMISTOR)	
POS101	PFRT002	THERMISTOR	
		(RELAY)	
RL101	PFSL003Z	RELAY	⚠
		(TRANSFORMER)	
T101	PFLT8E003	TRANSFORMER	⚠
T102	PFLT8E004	TRANSFORMER	⚠
		(CERAMIC FILTERS)	
L105	PFVF2A102ST	CERAMIC FILTER	
L106	PFVF2A102ST	CERAMIC FILTER	
		(RESISTORS)	
J158	ERJ3GEY0R00	0	
JJ262	ERJ3GEY0R00	0	
L121	ERJ3GEY0R00	0	
L122	ERJ3GEY0R00	0	
R111	ERJ3GEYJ473	47k	
R113	ERJ3GEYJ114	110k	
R114	ERJ3GEYJ114	110k	
R115	ERJ3GEYJ563	56k	
R116	ERJ3GEYJ563	56k	
R118	ERJ3GEYJ273	27k	
R122	ERJ3GEYJ184	180k	
R125	ERJ3GEYJ103	10k	
R128	ERJ3GEYJ682	6.8k	
R131	ERJ3GEYJ101	100	
R134	ERJ3GEYJ153	15k	
R135	ERJ3GEYJ472	4.7k	
R136	ERJ3GEY0R00	0	
R137	ERJ3GEY0R00	0	
R138	ERJ3GEYJ681	680	
R141	ERJ3GEYJ101	100	
R142	ERJ3GEYJ472	4.7k	
R143	ERJ3GEYJ103	10k	
R144	ERJ3GEYJ103	10k	
R151	ERJ3GEYJ472	4.7k	
R153	ERJ3GEYJ562	5.6k	

Ref. No.	Part No.	Part Name & Description	Remarks
R155	ERDS2TJ221	220	
R156	ERJ3GEYJ153	15k	
R158	ERDS2TJ221	220	
R159	ERJ3GEYJ103	10k	
R164	ERJ3GEYJ153	15k	
R166	ERJ3GEYJ102	1k	
R169	ERJ3GEYJ103	10k	
R174	ERJ3GEYJ473	47k	
R175	ERJ3GEYJ154	150k	
R176	ERJ3GEYJ114	110k	
R177	ERJ3GEYJ822	8.2k	
R182	ERJ3GEYJ682	6.8k	
R184	PQ4R10XJ103	10k	S
R185	PQ4R10XJ393	39k	S
R196	ERJ3GEYJ332	3.3k	
R202	ERDS1TJ473	47k	
R212	ERJ3GEYJ331	330	
R213	ERJ3GEYJ152	1.5k	
R214	ERJ3GEYJ152	1.5k	
R215	ERDS1TJ183	18k	
R216	ERJ3GEYJ472	4.7k	
R230	ERJ3GEYJ103	10k	
R231	ERJ3GEY0R00	0	
		(CAPACITORS)	
C110	ECUV1C104KBV	0.1	
C113	ECUV1E225ZF	2.2	
C116	ECUV1H181JCV	180P	
C117	PQCUV1H104ZF	0.1	
C119	ECUV1H181JCV	180P	
C126	ECUV1H680JCV	68P	
C129	ECUV1C104KBV	0.1	
C130	ECUV1C104KBV	0.1	
C133	PQCUV1H822KB	0.0082	S
C135	ECUV1H103KBV	0.01	
C136	ECEA1HKS4R7	4.7	
C144	ECUV1C104KBV	0.1	
C146	ECUV1H103KBV	0.01	
C147	ECUV1C104KBV	0.1	
C149	PQCUV1H104ZF	0.1	
C150	ECEA1HKS100	10	S
C153	ECEA1HKS4R7	4.7	
C159	ECEA1CKS100	10	
C161	ECUV1H183KBV	0.018	
C162	ECUV1H333KDV	0.033	S
C165	ECEA1HKS4R7	4.7	
C167	ECUV1H102KBV	0.001	
C171	ECEA1CKS100	10	
C172	ECA1CM221	220	
C179	ECKD2H681KB	680P	S
C180	ECKD2H681KB	680P	S
C190	ERJ6GEY0R00	0	
C198	ECQE2E105KZ	1	S
C207	ECEA1CK101	100	S













Ref. No.	Part No.	Part Name & Description	Remarks
C212	ECUV1C475ZF	4.7	
C214	ECUV1H103KBV	0.01	
C222	PQCUV1H104ZF	0.1	
C223	ECEA1HKS100	10	S
C224	ECUV1H681KBV	680P	
C225	ECUV1H681KBV	680P	






11.4. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFWP4FP85M	OPERATION BOARD ASS'Y (RTL)	
		(Refer to OPERATION PANEL SECTION ()).	
		(ICS)	
IC301	MN7D032Z9J	IC	
IC302	PFVINJM2904M	IC	
		(DIODE)	
LED303	LNJ801LPDJA	DIODE(SI)	
		(CONNECTOR)	
CN301	PQJP11G43Y	CONNECTOR,11PIN	
CN303	PQJP3G43Z	CONNECTOR,3PIN	
		(SWITCHES)	
SW352	PFSH1A002Z	SWITCH, DOCUMENT TOP	
SW353	PFSH1A002Z	SWITCH, DOCUMENT TOP	
		(LIQUID CRYSTAL DISPLAY)	
CN302	PFAVM190	LIQUID CRYSTAL DISPLAY	
		(RESISTORS)	
R301	ERJ3GEYJ471	470	
R302	ERJ3GEYJ471	470	
R303	ERJ3GEYJ273	27k	
R305	ERJ3GEYJ681	680	
R312	ERJ3GEYJ271	270	
R314	ERJ3GEYJ472	4.7k	
R315	ERJ3GEYJ101	100	
R316	ERJ3GEYJ472	4.7k	
R317	ERJ3GEYJ101	100	
R318	ERJ3GEYJ4R7	4.7	
R351	ERJ3GEYJ331	330	
R352	ERJ3GEYJ682	6.8k	
R353	ERJ3GEYJ123	12k	
R354	ERJ3GEYJ682	6.8k	
R355	ERJ3GEYJ223	22k	
R356	ERJ3GEYJ334	330k	
R357	ERJ3GEYJ222	2.2k	
R385	ERJ3GEYJ331	330	
		(CAPACITORS)	
C302	ECUV1C104KBV	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C303	ECEA0JKS101	100	
C304	ECUV1C104KBV	0.1	S
C305	ECUV1H101JCV	100P	
C308	ECUV1H331JCV	330P	
C309	ECUV1H331JCV	330P	
C310	ECUV1C104KBV	0.1	S
C311	ECUV1C104KBV	0.1	S
C314	ECUV1C104KBV	0.1	S
C316	ECUV1H103KBV	0.01	
C317	ECUV1H103KBV	0.01	
C352	ECEA0JKS101	100	
C353	ECUV1H153KBV	0.015	
C354	ECUV1C104KBV	0.1	S
C355	ECUV1H181JCV	180P	
C356	ERJ3GEY0R00	0	
C357	ECUV1C104KBV	0.1	S
C369	ECEA0JKS101	100	
		(SWITCHES)	
SW302	PQSH1A105Z	SWITCH	
SW303	PQSH1A105Z	SWITCH	
SW304	PQSH1A105Z	SWITCH	
SW305	PQSH1A105Z	SWITCH	
SW306	PQSH1A105Z	SWITCH	
SW307	PQSH1A105Z	SWITCH	
SW308	PQSH1A105Z	SWITCH	
SW309	PQSH1A105Z	SWITCH	
SW310	PQSH1A105Z	SWITCH	
SW311	PQSH1A105Z	SWITCH	
SW312	PQSH1A105Z	SWITCH	
SW313	PQSH1A105Z	SWITCH	
SW314	PQSH1A105Z	SWITCH	
SW315	PQSH1A105Z	SWITCH	
SW316	PQSH1A105Z	SWITCH	
SW317	PQSH1A105Z	SWITCH	
SW318	PQSH1A105Z	SWITCH	
SW319	PQSH1A105Z	SWITCH	
SW320	PQSH1A105Z	SWITCH	
SW321	PQSH1A105Z	SWITCH	
SW322	PQSH1A105Z	SWITCH	
SW323	PQSH1A105Z	SWITCH	
SW324	PQSH1A105Z	SWITCH	
SW326	PQSH1A105Z	SWITCH	
SW327	PQSH1A105Z	SWITCH	
SW328	PQSH1A105Z	SWITCH	
SW329	PQSH1A105Z	SWITCH	
SW330	PQSH1A105Z	SWITCH	
SW331	PQSH1A105Z	SWITCH	
SW333	PQSH1A105Z	SWITCH	
SW334	PQSH1A105Z	SWITCH	
SW335	PQSH1A105Z	SWITCH	
SW351	EVEGB141112B	SWITCH	

11.5. POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	PFLP1282EZL	POWER SUPPLY BOARD ASS'Y (RTL)	 ;
		(ICS)	
IC101	PFVIFA5317P	IC	
IC201	AN1431T	IC	
IC202	PFVITA7805F	IC	S
		(TRANSISTORS)	
Q101	2SK2651	TRANSISTOR(SI)	
		(DIODES)	
D101	PFVD1N4005	DIODE(SI)	 S
D102	PFVD1N4005	DIODE(SI)	 S
D103	PFVD1N4005	DIODE(SI)	 S
D104	PFVD1N4005	DIODE(SI)	 S
D105	PFVDEG01C	DIODE(SI)	S
D106	MA165	DIODE(SI)	
D107	MA4220	DIODE(SI)	
D108	PQVDERA1802	DIODE(SI)	S
D201	PFVDSF5LC20U	DIODE(SI)	S
D202	PFVDD1NL20U	DIODE(SI)	S
		(COIL)	
L101	ELF15N006A	COIL	
		(COMPONENTS PARTS)	
L103	EXCELDR35	COMPONENTS PARTS	
		(CONNECTORS)	
CN31	PQJP2D98Z	CONNECTOR, 2 PIN	
CN301	PQJP7G30Z	CONNECTOR, 7 PIN	
		(FUSE)	
F101	PQBA2C31TRLW	FUSE	 S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC101	PFVIPC123	PHOTO ELECTRIC TRANSDUCER	 S
		(THERMISTOR)	
TH101	PFRT57235S80	THERMISTOR	S
		(TRANSFORMER)	
T101	PFLTSRW292ED	TRANSFORMER	 S
		(VARIABLE RESISTOR)	
VR201	EVNDJAA03B53	VARIABLE RESISTOR	
		(VARISTOR)	

Ref. No.	Part No.	Part Name & Description	Remarks
ZNR101	ERZV10DK751U	VARISTOR	
		(RESISTORS)	
R101	ERDS1J105	1M	
R102	ERDS2TJ394	390k	
R103	ERDS2TJ394	390k	
R104	ERG2SJ304	300k	
R105	ERX2SJR22	0.22	
R106	ERG2SJ470	47	
R107	ERG2SJ304	300k	
R108	ERDS2FJ150	15	
R109	ERDS2TJ100	10	
R121	PQ4R10XJ103	10k	S
R122	PQ4R10XJ271	270	
R124	PQ4R10XJ181	180	S
R125	PQ4R10XJ103	10k	S
R126	PQ4R10XJ562	5.6k	S
R127	PQ4R10XJ182	1.8k	S
R128	PQ4R10XJ101	100	S
R136	PQ4R10XJ104	100k	S
R137	PQ4R10XJ104	100k	S
R202	ERG2SJ152	1.5k	
R203	ERDS2FJ470	47	
R221	PQ4R10XJ222	2.2k	S
R222	PQ4R10XJ222	2.2k	S
R223	PQ4R10XJ101	100	S
R224	PQ4R10XJ273	27k	S
R225	PQ4R10XJ332	3.3k	S
		(CAPACITORS)	
C101	ECQU2A224MG	0.22	
C102	ECQU2A104MG	0.1	
C103	PFKDE2GA102K	0.001	S
C105	PFKDE2GA222M	0.0022	
C106	PFCEA400SX56	56	S
C108	ECKD3A102KBP	0.001	
C109	ECA1VHG470	47	
C110	PFKDD2GA222M	0.0022	S
C119	PFCKDSL470J	47P	S
C121	ECUV1H472KBN	0.0047	
C122	ECUV1C224KBX	0.22	
C123	ECUV1H561KBN	560P	
C124	ECUV1E104KBX	0.1	S
C201	PFCEA35F471	470	S
C202	ECKD3A102KBP	0.001	
C203	PFCEA16A470	470	S
C204	PFCEA35A47M	47	S
C205	PFCEA50A47M	0.47	S
C206	ECKD3A102KBP	0.001	
C221	ECUV1E104KBX	0.1	

11.6. RS232C BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	PFLP1228MZ	RS232C BOARD ASS'Y (RTL)	
		(CONNECTORS)	
CN1	PFJS25A05Y	CONNECTOR, 25P	
CN2	PQJP11G43Y	CONNECTOR, 11P	

11.7. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PQZZ2K12Z	CONNECTOR, 2P	
EC2	PFZZ10K1Z	CONNECTOR, 10P	
EC3	PFZZ17K2Z	CONNECTOR, 17P	
EC4	PQZZ7K5Z	CONNECTOR, 7P	
EC5	PFZZ11K13Z	CONNECTOR, 11P	
EC6	PFZZ5K13Z	CONNECTOR, 5P	
EC7	PQZZ11K4Z	CONNECTOR, 11P	
EC8	PQZZ2K13Z	CONNECTOR, 2P	
EC9	PQZZ3K8Z	CONNECTOR, 3P	
EC10	PFZZ10K3Z	CONNECTOR, 10P	
EC11	PFZZ11K12Z	CONNECTOR, 11P	
EC20	PFZZFP85M	VOICE PROMPT ROM	
		(Refer to FLASH MEMORY (IC501)).	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE	
		(For training service technicians)	

Note:

Tools and Extension Cords are useful for servicing.
(They make servicing easy.)

12. PRINTED CIRCUIT BOARD

12.1. DIGITAL BOARD: BOTTOM VIEW (PCB1)

12.2. DIGITAL BOARD: COMPONENT VIEW

12.3. ANALOG BOARD: BOTTOM VIEW for KX-FM89BX

12.4. ANALOG BOARD: COMPONENT VIEW for KX-FM89BX

12.5. ANALOG BOARD: BOTTOM VIEW for KX-FM89CX

12.6. ANALOG BOARD: COMPONENT VIEW for KX-FM89CX

12.7. OPERATION BOARD: COMPONENT VIEW

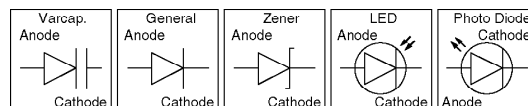
12.8. OPERATION BOARD: BOTTOM VIEW

12.9. POWER SUPPLY BOARD

13. FOR THE SCHEMATIC DIAGRAMS

Note:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.
- 3.



Important safety notice
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

14. SCHEMATIC DIAGRAM

14.1. DIGITAL BOARD for KX-FM89BX

14.2. DIGITAL BOARD for KX-FM89CX

14.3. ANALOG BOARD for KX-FM89BX

14.4. ANALOG BOARD for KX-FM89CX

14.5. OPERATION BOARD

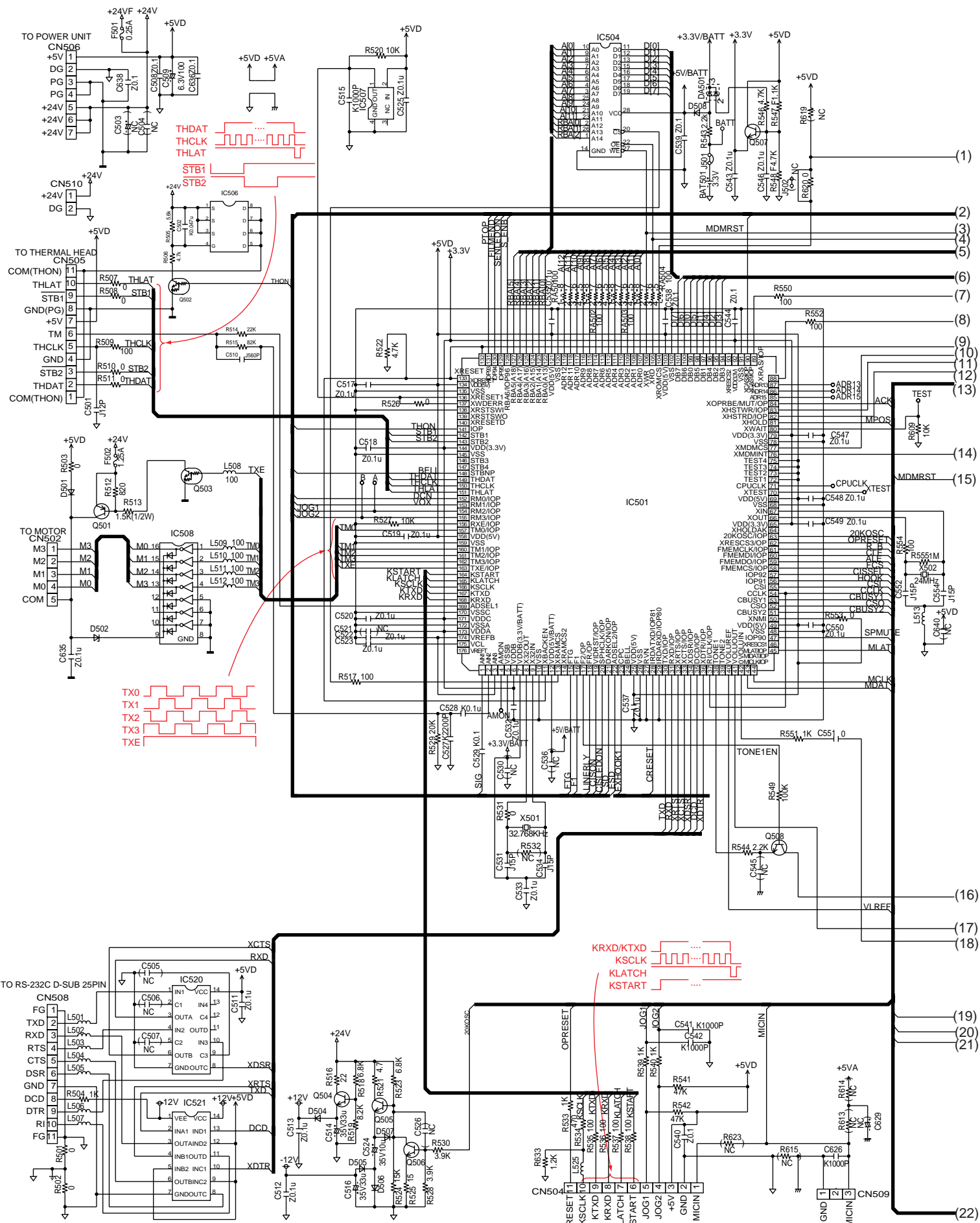
14.6. POWER SUPPLY BOARD

15. RS232C BOARD

15.1. PRINTED CIRCUIT BOARD

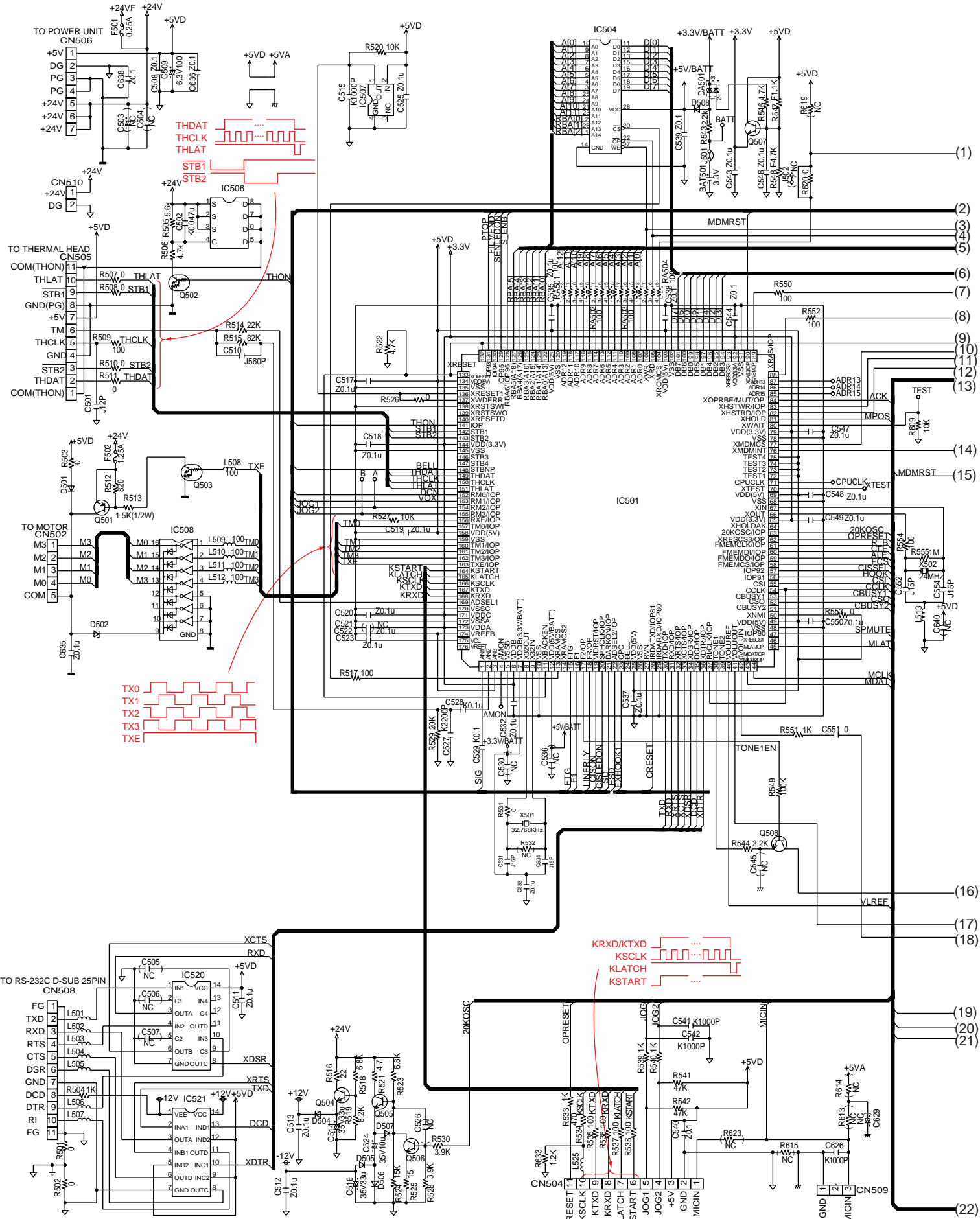
15.2. SCHEMATIC DIAGRAM

TN / KXFM89BX / KXFM89CX



DIGITAL BOARD SCHEMATIC DIAGRAM
KX-FM89BX

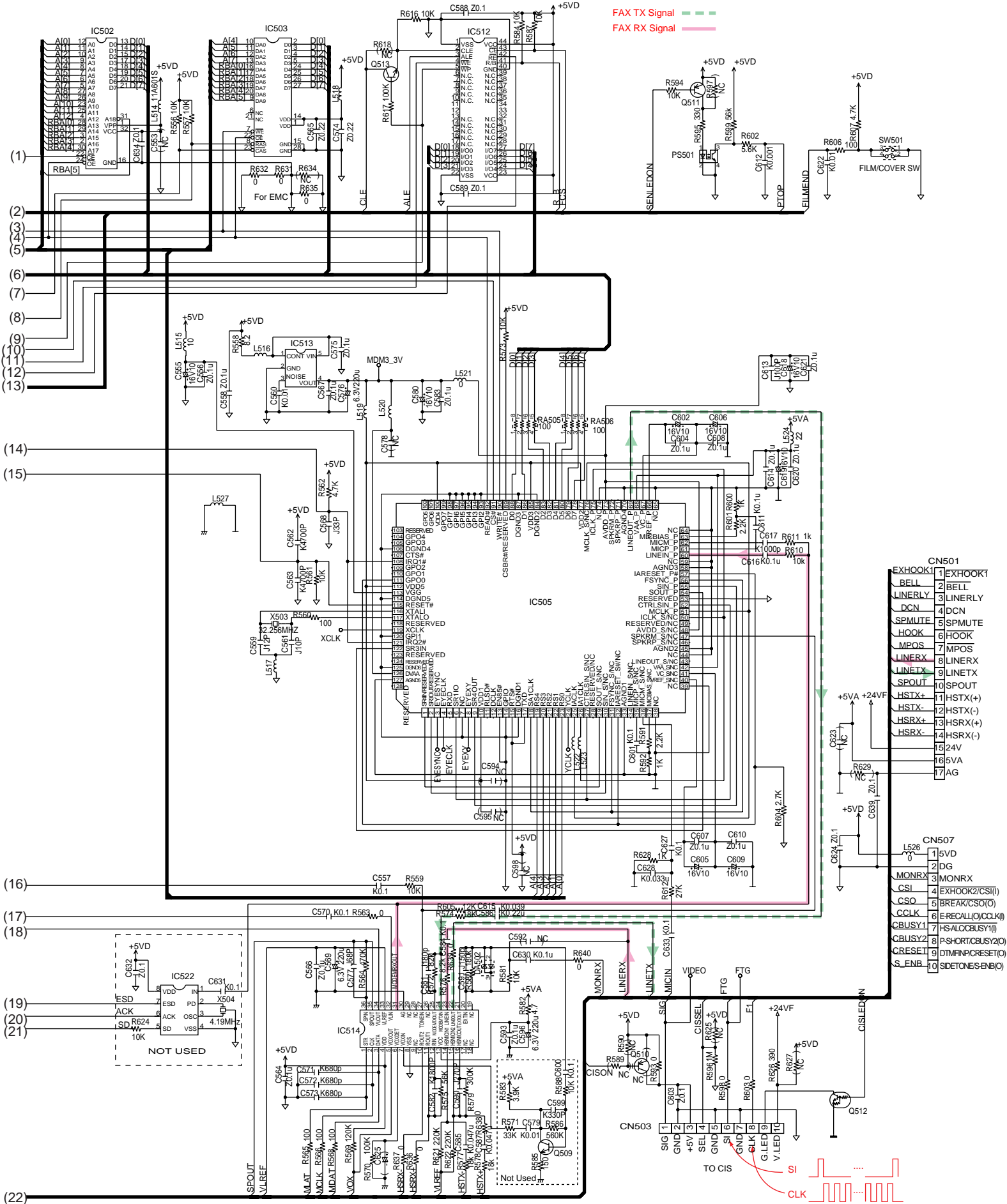




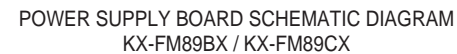
DIGITAL BOARD SCHEMATIC DIAGRAM
KX-FM89CX

TO OPERATION PANEL

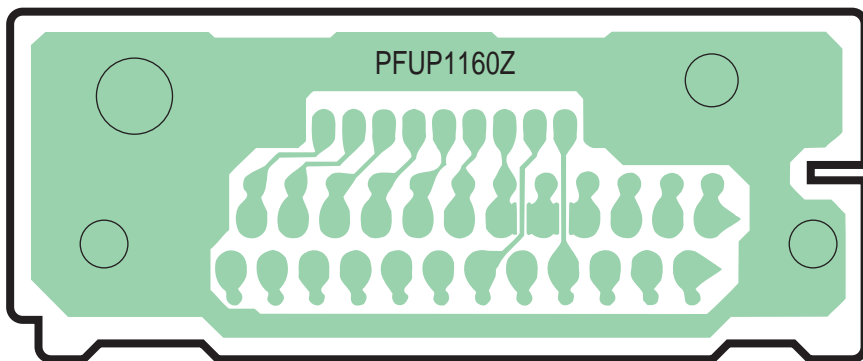
TO OPEANE MIC



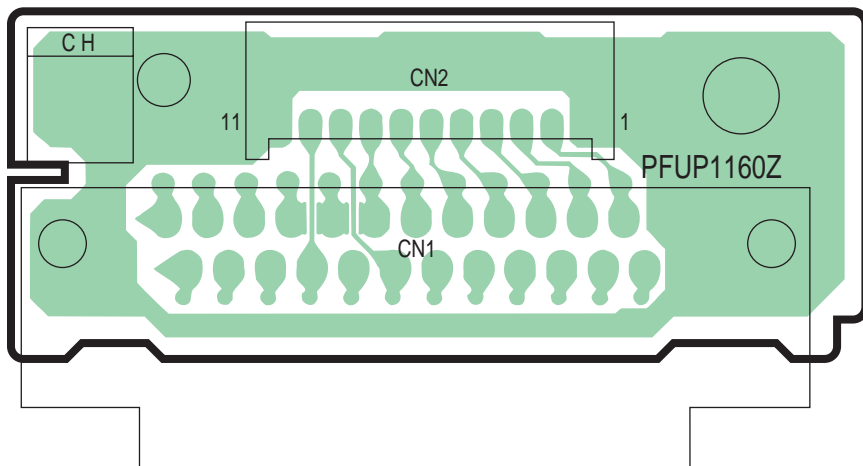


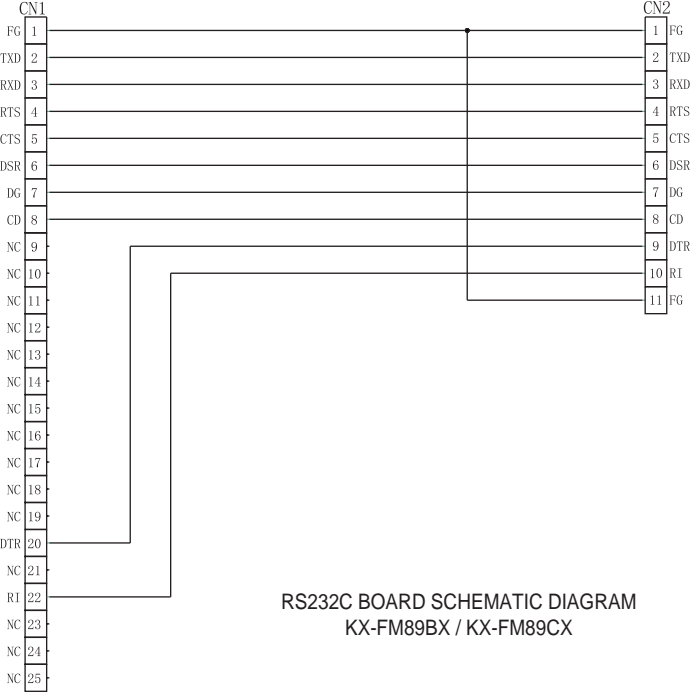


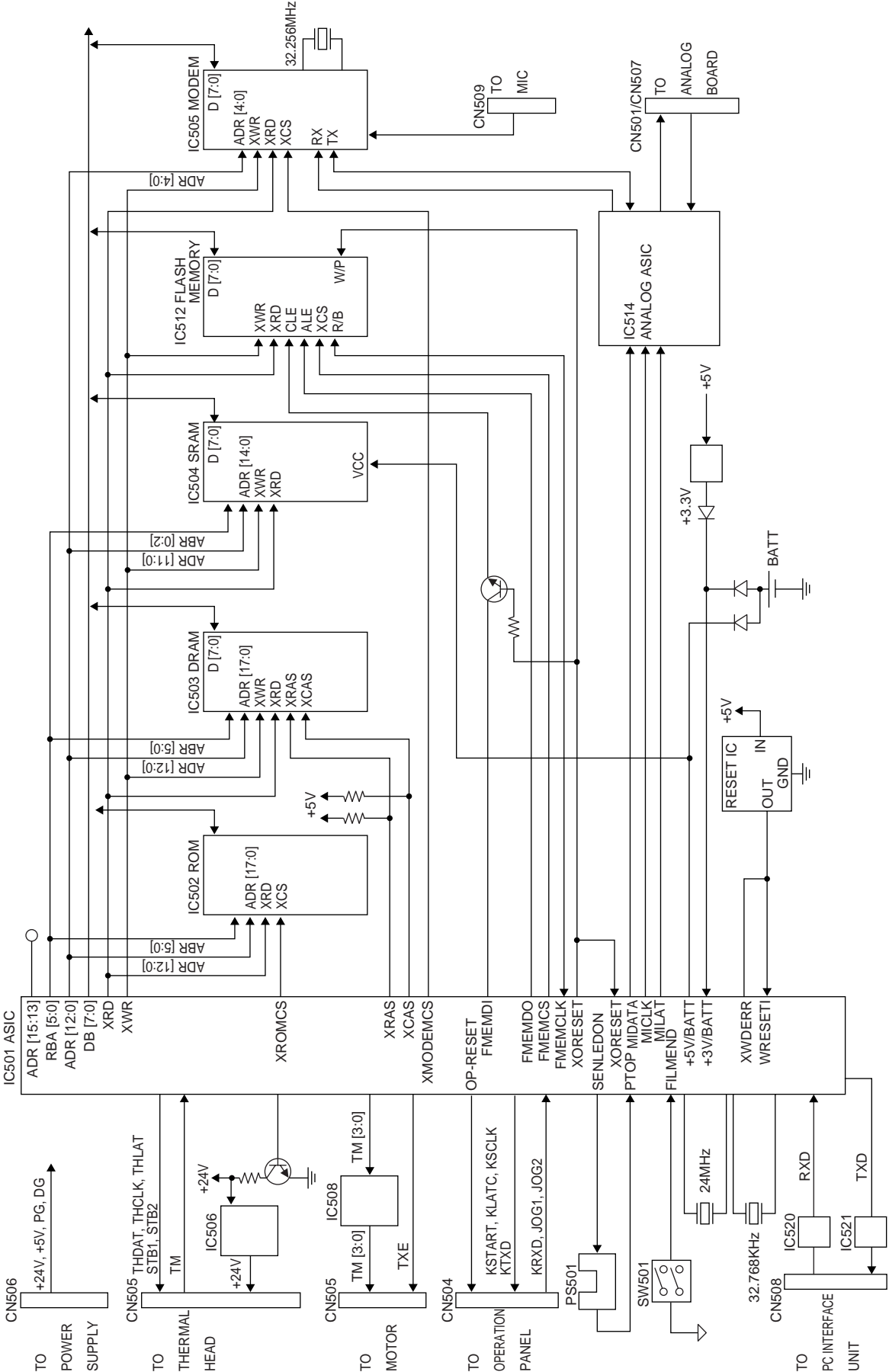
(COMPONENT VIEW)

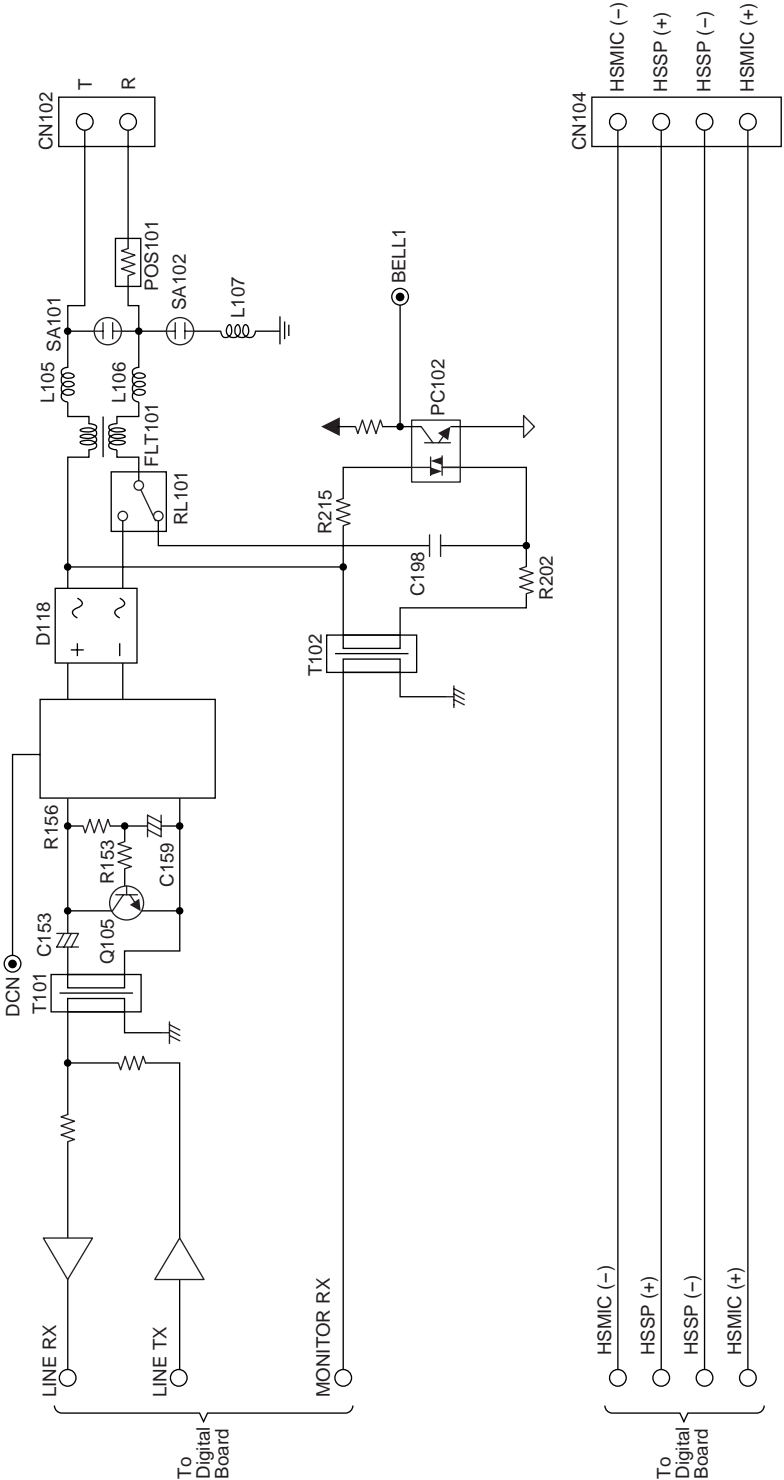


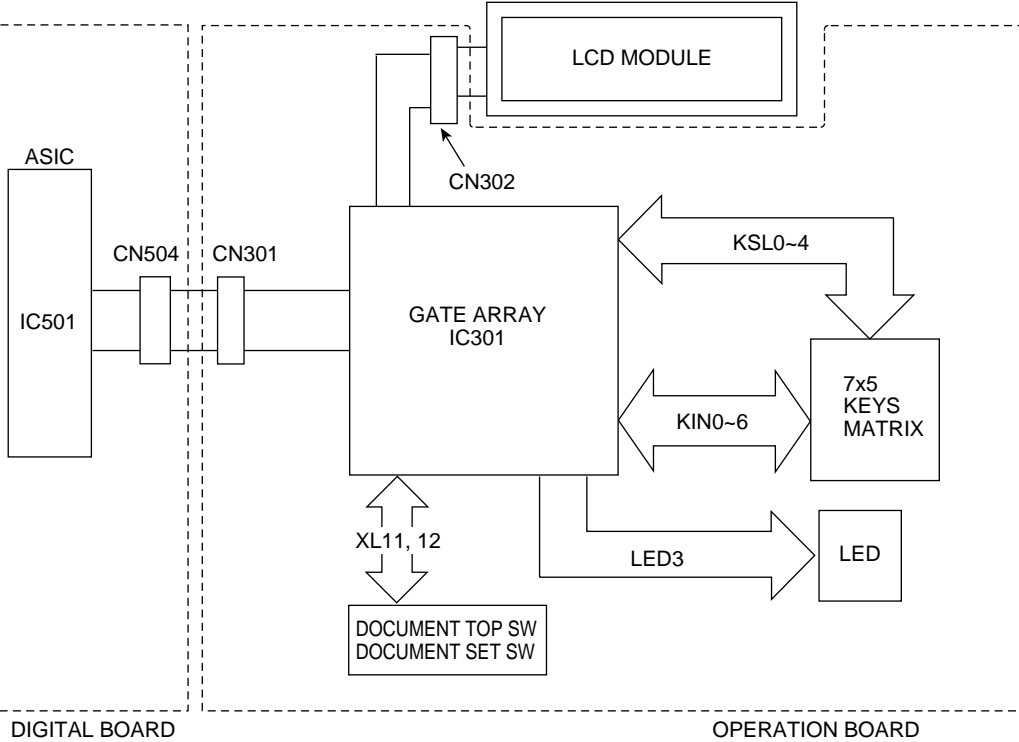
(BOTTOM VIEW)

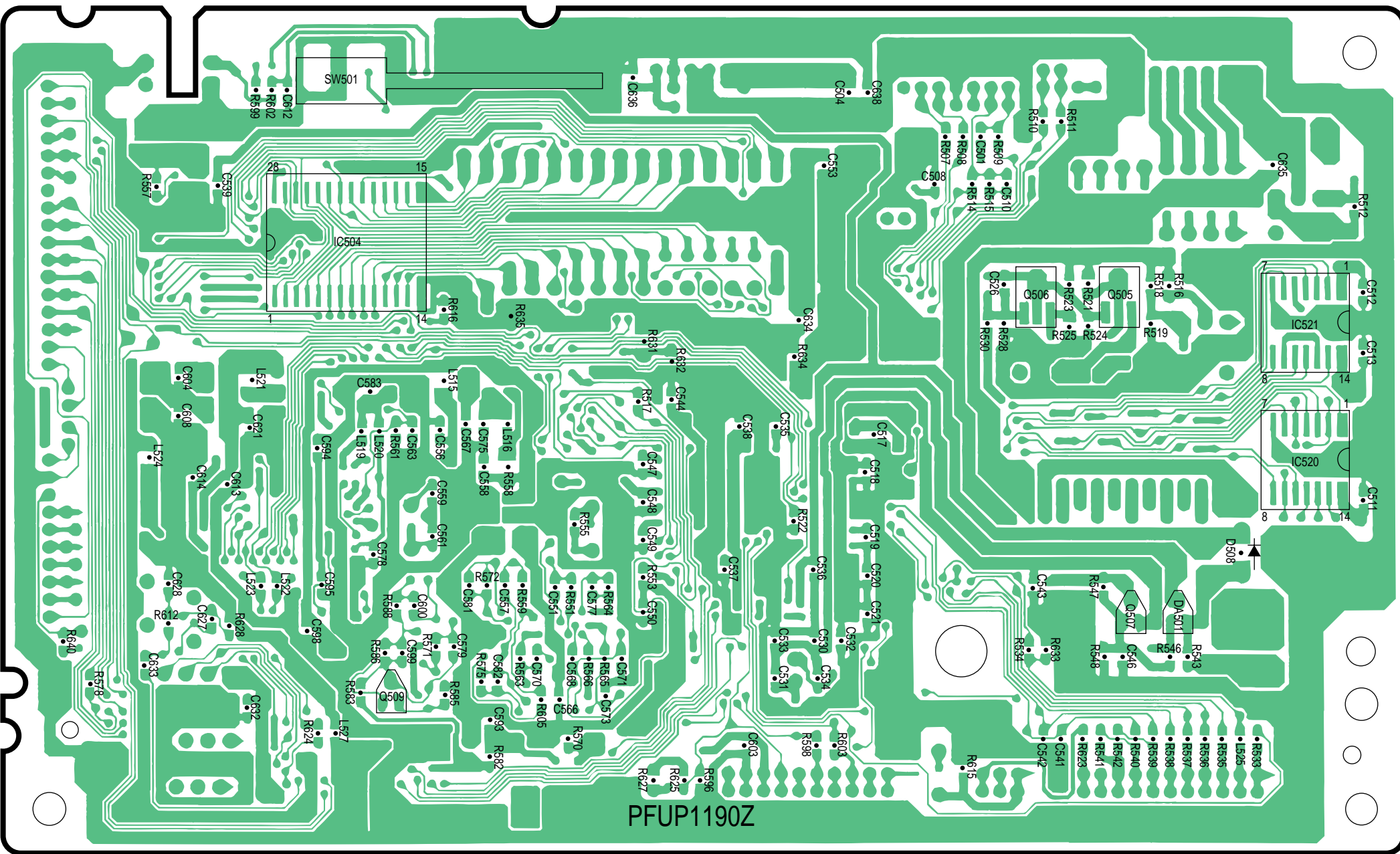


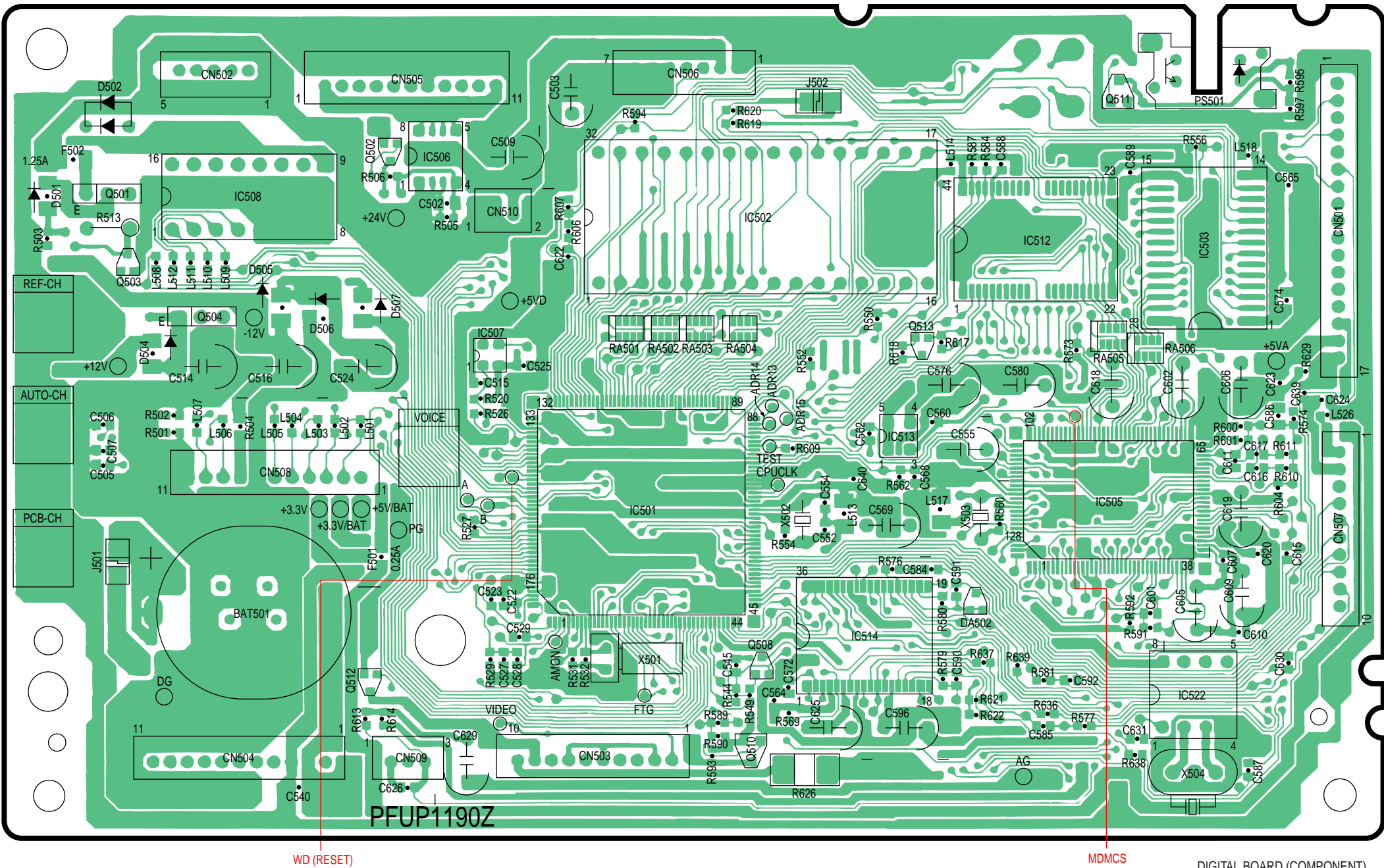


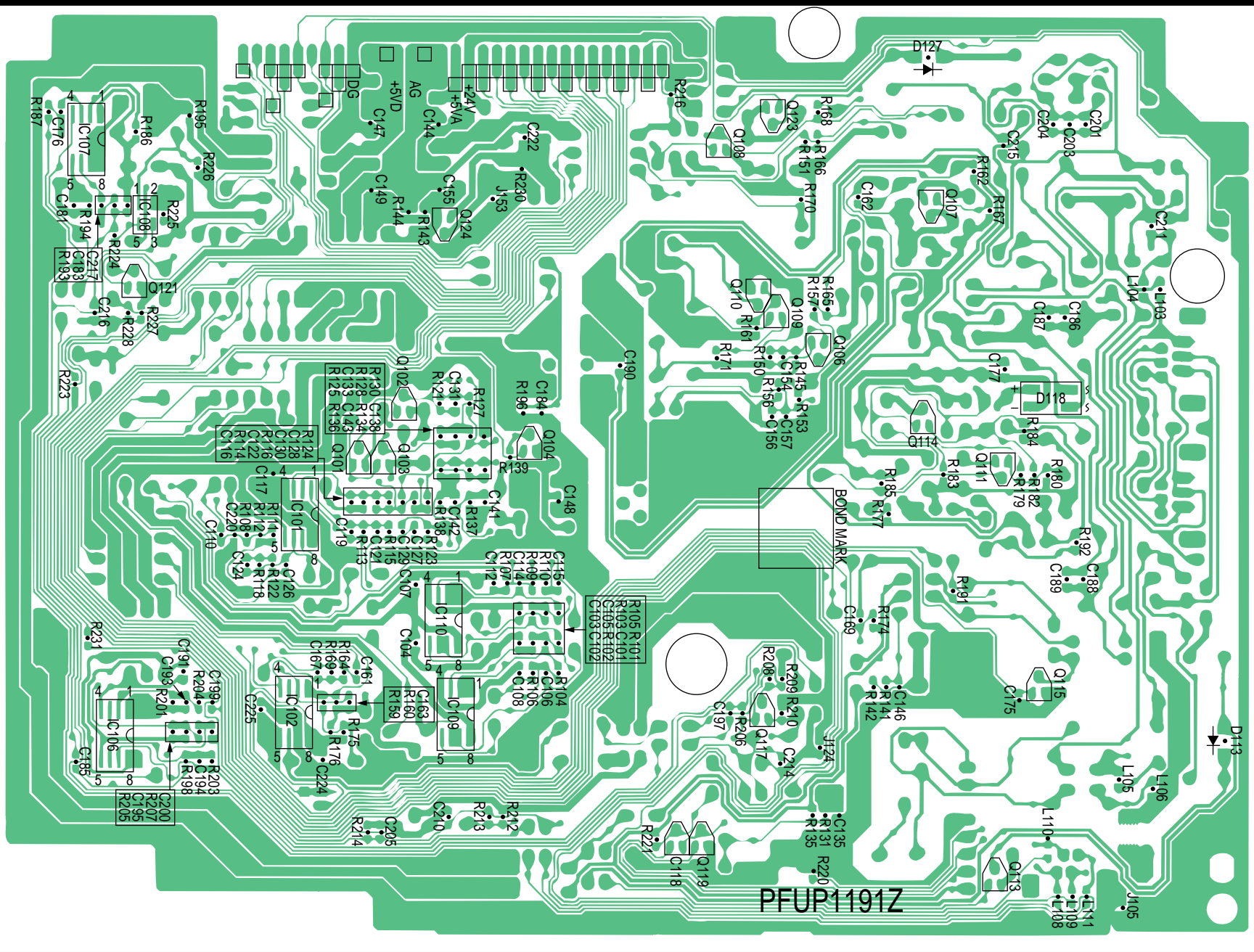


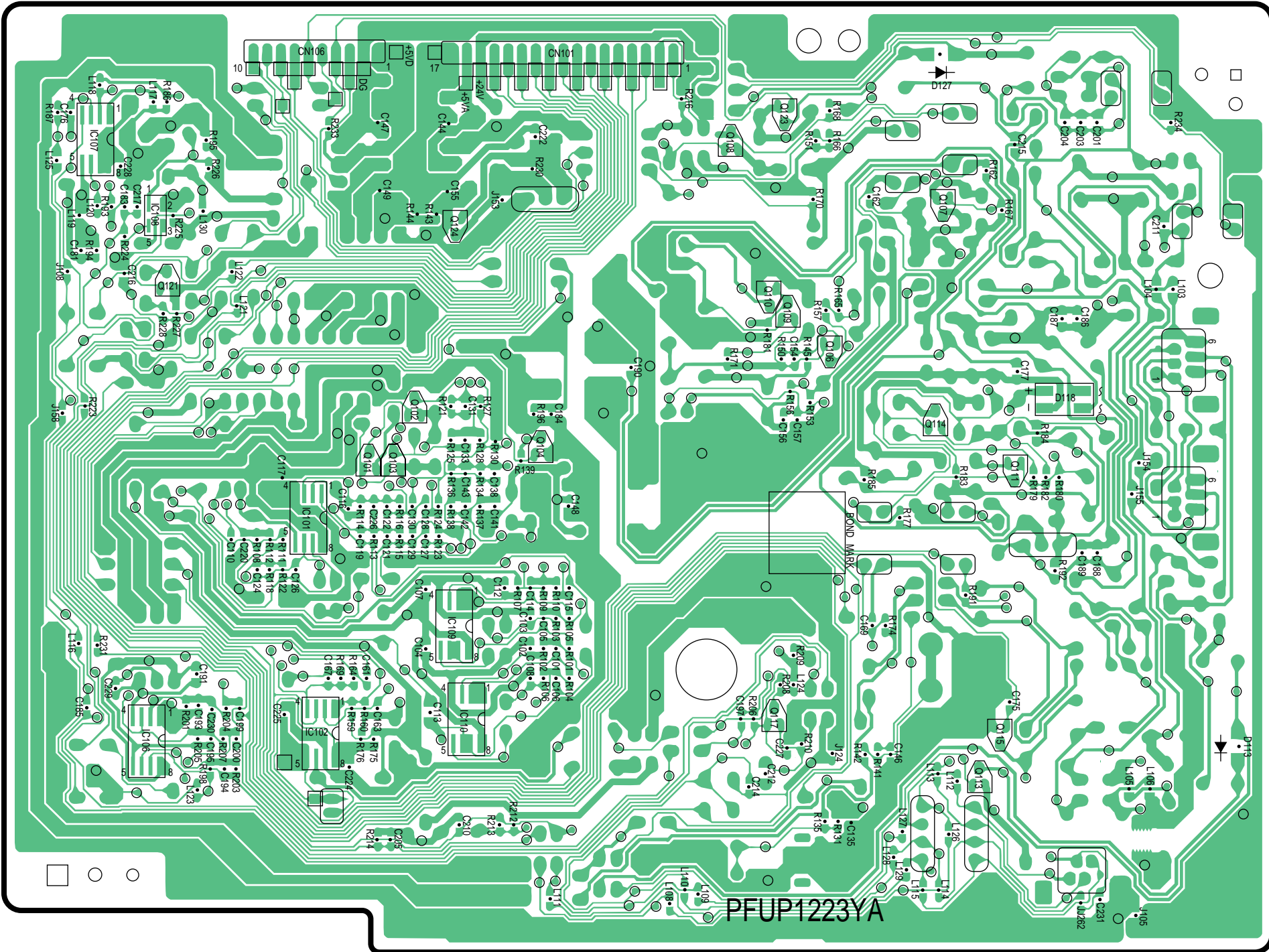




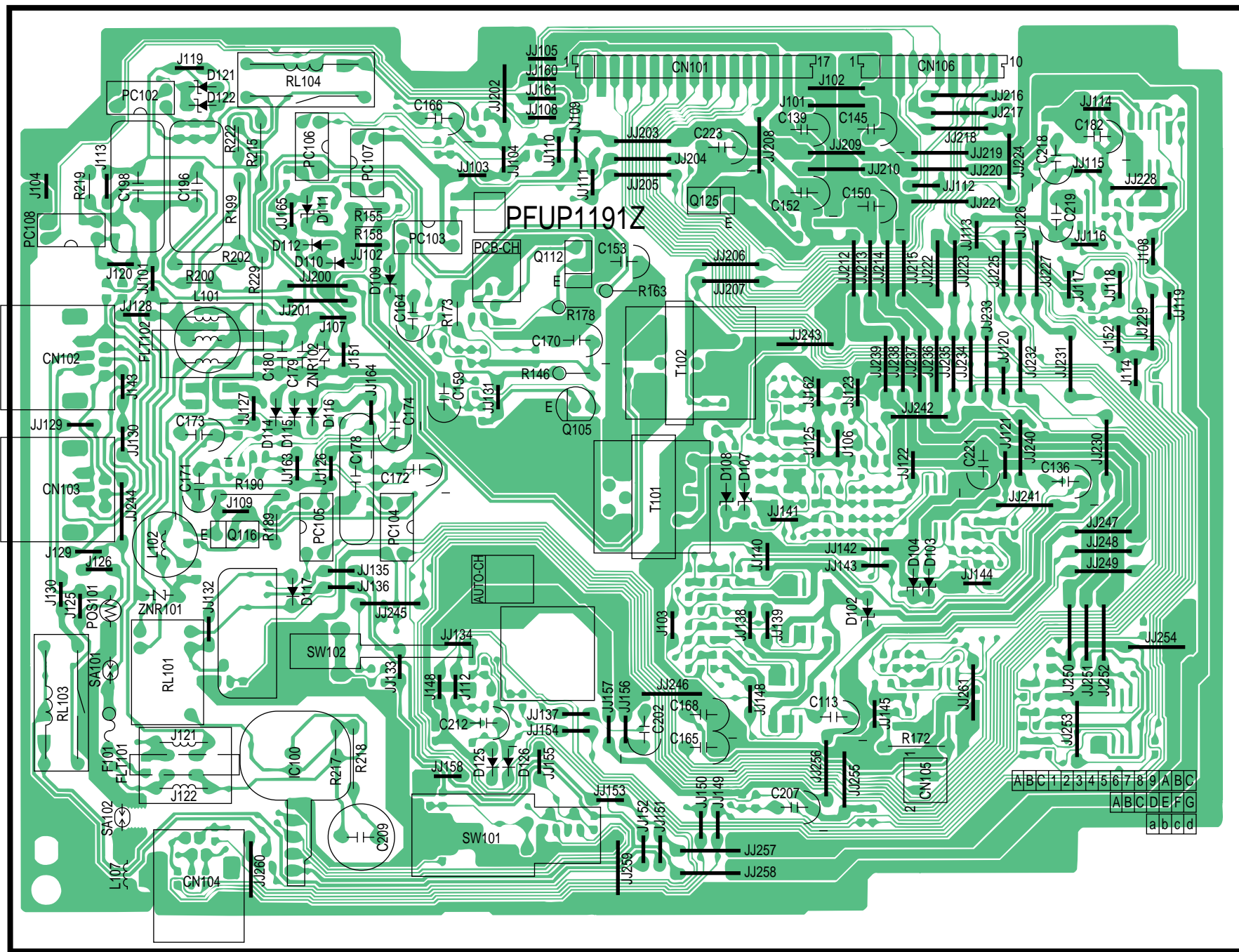




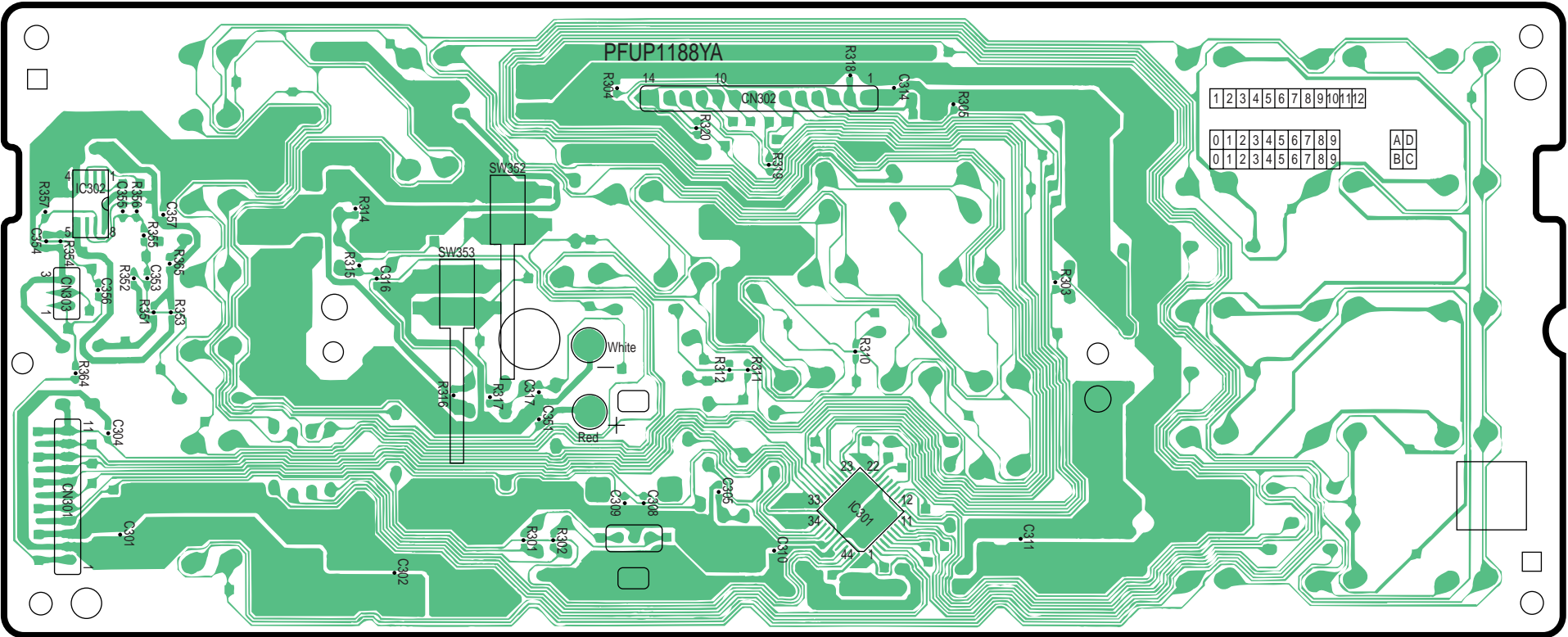




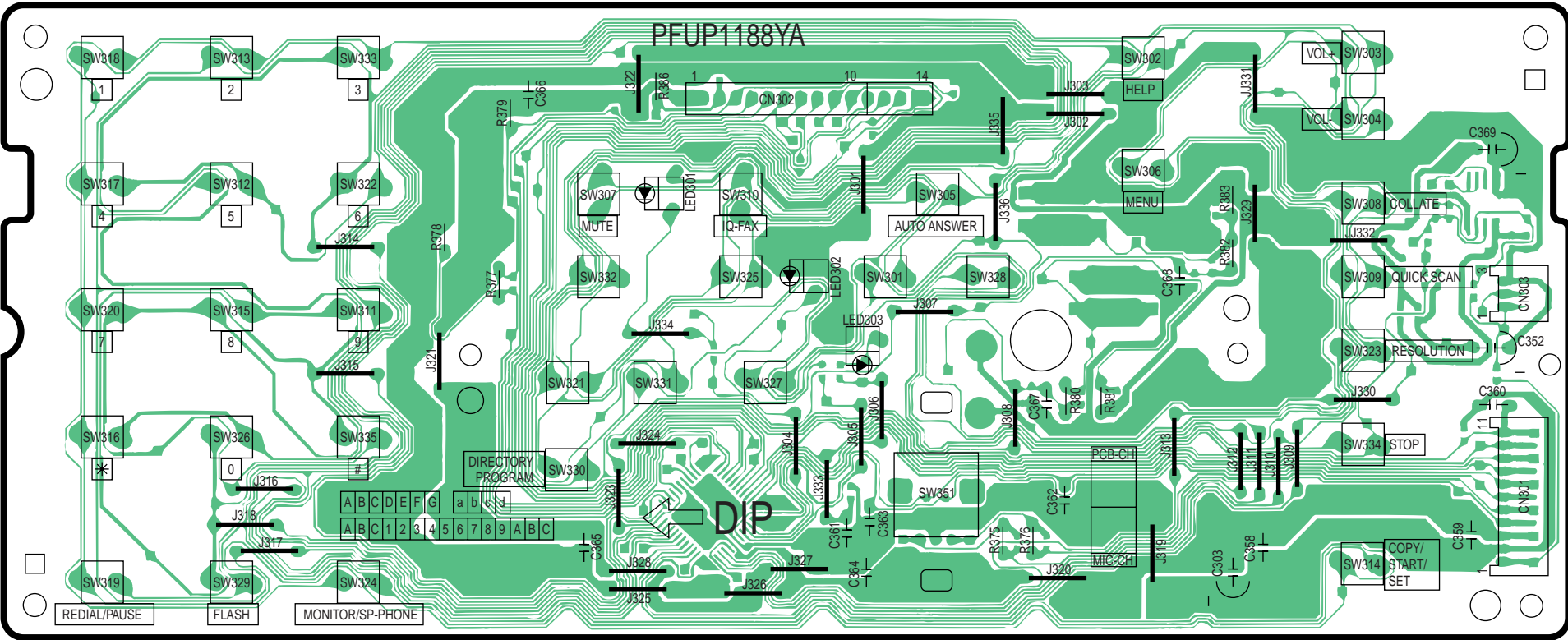
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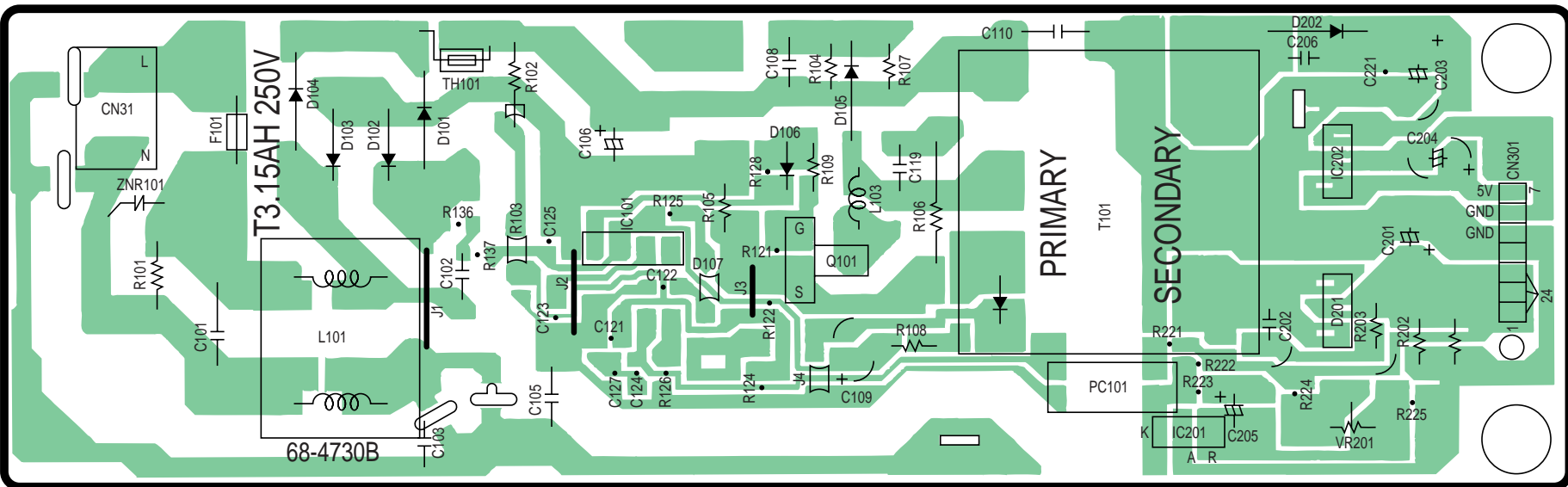




OPERATION BOARD (BOTTOM)
KX-FM89BX / KX-FM89CX



(BOTTOM VIEW)



(COMPONENT VIEW)

